Original Article

The digitally engaged patient: Self-monitoring and self-care in the digital health era

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Abstract   The phenomenon of digital health has emerged as a key dimension of contemporary healthcare policy and delivery in many countries. This review article focuses on one aspect of digital health discourses: the concept of patient engagement that encourages patients to take up the new digital media technologies to engage in self-monitoring and self-care, or what I term 'the digitally engaged patient'. A critical approach is adopted to examine the sociocultural dimensions of eliciting patients to become 'digitally engaged' in their own medical care and preventive health efforts. It is argued that the techno-utopian discourses articulated in the mainstream healthcare policy literature concerning the possibilities and potentialities afforded by digital health technologies do not acknowledge the complexities and ambivalences that are part of using self-monitoring and self-care technologies for monitoring health and illness states, both for patients and for healthcare providers. These include the surveillance and disciplinary dimensions of using these technologies, the emotions and resistances they provoke, their contribution to the burden of self-care and the invisible work on the part of healthcare workers that they require to operate.

Introduction

Frequent statements are now made in the medical and public health literature about an imminent revolution in healthcare, preventive medicine and public health driven by the use of new digital medical and health-related technologies, variously termed 'digital health', 'eHealth', Medicine 2.0' or 'Health 2.0'. In this

literature, digital media technologies are described as contributing to a range of aspects of medicine and healthcare. These include the use of digitalised health information systems; the employment of wireless mobile digital devices and wearable, implanted or inserted biosensors for lay people to monitor their health, wellbeing and physical function and engage in self-care of illness, chronic medical conditions or disability remotely; conducting medical consultations via digital media; the use of digital technologies by lay people to seek out information about health, illness and medical treatments and therapies and to share their experiences and health-related data with others; the use of social media sites by healthcare providers to provide information about their services and interact with patients; the digitising of individuals' genomic sequencing data; and digital medical imaging.

Predictions of how these technologies will come to dominate in medical and public health as a means of delivering patient care, collecting and sharing medical and health-related data and bestowing responsibility upon lay people to manage their own health have proliferated. Digital health technologies are described as promoting communication between healthcare providers and patients, encouraging lay people to engage in preventive health activities and improving patient adherence to treatment protocols and their self-management of chronic diseases.

The rapid changes wrought by digital health technologies, particularly the newer technologies associated with Web 2.0 innovations, have only just begun to be documented and analysed in the academic critical social scientific literature. Most publications have been written from a largely uncritical preventive medical or health promotion perspective and adopt a techno-utopian perspective, tending to laud the possibilities of these technologies without acknowledging the social, ethical and political implications of their use. From a critical sociological perspective, however, a more in-depth and nuanced analysis may be undertaken of how these technologies may operate to construct various forms of subjectivities and embodiments and participate in the configuring and reproduction of power relations.

There is an extensive sociological literature that has addressed patient consumerism and medical technologies in general, and more specifically previous forms of telemedicine and self-care and self-monitoring technologies. Writers publishing on these topics are able to provide important insights into the complexities of how patients engage with these technologies and the implications for how they conceptualise their bodies/selves, health, illness and healthcare. In this article, following an overview of the concept of the digitally engaged patient, I draw upon some of this literature and highlight its implications for the newer forms of practices, identities and politics of self-care and self-monitoring as they promoted in the digital health literature. The broad theoretical approach

largely rests on what is variously titled the sociotechnical or material semiotic approach to human–technology interactions. Writers in this literature now often refer to the 'assemblages' that are configured via the encounters of human bodies, knowledges, ideas, discourses and material objects and spaces (Marcus, 2006). From this perspective, technologies enact complex bodily experiences and concepts of selfhood. Changes in medical technologies represent transformations in how bodies are conceptualised, touched, managed and visually displayed. Rather than simply neutrally mirroring key aspects of a pre-given natural body, technologies as they operate in medicine and healthcare configure and reconfigure the body in certain ways, enacting how they are understood and treated (see, for example, Mol and Law, 2004; Nicolini, 2007; Oudshoorn, 2011).

The Digitally Engaged Patient

When discussing the apparent imminent revolution in healthcare driven by the new digital technologies, the terms 'patient engagement' or 'patient empowerment' (Barello *et al*, 2012; Morden *et al*, 2012; Swan, 2012) are frequently used. In this discourse, the 'patient' or 'lay person' becomes a 'participant' who is actively involved in self-care: 'at the centre of action-taking in relation to health and healthcare' (Swan, 2012, p. 97). More specifically, and particularly in the United States, the term 'patient activation' is employed, often in relation to a bureaucratic model representing patients as being 'more effective managers of their health and healthcare' (Greene and Hibbard, 2012, p. 520).

These discourses represent the latest version of the 'patient as consumer' approach that has circulated in various formulations since the 1970s. In the wake of consumerist and health activist movements emerging during that decade, there were calls from some quarters for healthcare to become 'democratised', for lay people to become more conversant with health and medical issues, engage in preventive health behaviours and seek to position their doctors as providers whose knowledge and expertise should not simply be taken for granted (Lupton, 1997a; Greener, 2003; Mort *et al*, 2009). At that time, lay people had little access to alternative sources of medical knowledge other than coverage of health and medical issues in the news media, books written for a lay readership and patient support groups that may have shared information in face-to-face meetings or by distributing photocopied newsletters. Since then, access to medical information and to other patients' experiences of healthcare and treatment has expanded exponentially: first via Web 1.0 and now Web 2.0 technologies.

In contemporary discussions of patient consumerism, the discourse of patient engagement is brought together with that of digital medicine to construct the figure of what I term 'the digitally engaged patient' when lay people are advised

that they should use digital technologies as part of patient engagement practices. For some commentators, the Web 2.0 era has heralded new ways of encouraging patients to be more engaged in healthcare and preventive health endeavours that go well beyond using websites to seek out health information or participating in patient support groups.

One important feature of Web 2.0 technologies is their mobility and capacity to be used across diverse spatial and temporal settings. References are now frequently made to the phenomenon of 'ubiquitous computing', or the capacity to connect to the Internet wirelessly from almost any location using mobile digital devices that are small and readily portable (Goggin, 2011). Mobile digital technologies and patient information exchange websites have been established that allow people with specific conditions to share information about their symptoms and treatments, facilitating the aggregation (crowdsourcing) of data. Patients are now often encouraged to use web-based personal health repositories like Microsoft HealthVault to keep records of their symptoms and treatments, view their medical test results and facilitate communication with healthcare providers (Gruman, 2013).

A major form of digital patient engagement is that involved in telemedicine practices. In several countries over the past decade, including the United States, the UK and some parts of continental Europe, telemedicine has become a major part of healthcare delivery. Telemedicine involves using digital and other technologies to encourage patients to self-monitor their medical conditions at home, thus reducing visits to or from healthcare providers, and to communicate with healthcare providers via these technologies rather than face to face. With its promise of reducing healthcare costs, this approach to medical care has been bestowed with new importance following the global financial crisis and the resultant strain on the economies of many developed countries (De Vogli, 2011).

For example, the new model of healthcare funding proposed by the US Patient Care and Affordable Care Act (otherwise known as 'Obamacare') that was signed into law in 2010 moves healthcare away from the traditional fee-for-service model to one that rewards preventive care activities by financially penalising hospitals with high patient readmissions. This system promotes telecare and patient self-monitoring at home as means of achieving fewer readmissions (Malykhina, 2013). It employs not only the older technologies used in telecare such as videoconferencing (now facilitated by devices such as smartphones and tablet computers) but also newer wireless technologies, such as wearable sensors attached to the body by adhesives to record such bodily functions as heart rate, respiration and physical activity levels, ingestible medications embedded with sensors that can send digital signals to armbands worn by the patient and wireless stethoscopes that enable doctors to hear the heartbeat of

patients remotely. These technologies are at the heart of promoting remote patient monitoring (Ringquist, 2013).

Digital Health Technologies, the Body and Patienthood

The discourses of the digitally engaged patient suggest that 'empowerment' may be achieved by using sophisticated digital technologies for self-monitoring and self-care. These discourses suggest that control over one's recalcitrant body and its ills can be better achieved via technological means. Lay people are expected and encouraged to develop routines to regularly assess these physiological markers and thus to develop the type of expertise in monitoring their bodies that was once the preserve of healthcare providers.

The current focus on digitising human bodies and the data they produce is the latest step in an inexorable move in medical practice towards using visualising and monitoring technologies to map and survey the human body, to gaze inside it and examine its functions in greater detail and to record and analyse the data produced by these activities (Cartwright, 1995; Waldby, 1997). The trend towards encouraging patient self-care facilitated by digital technologies is under-pinned by what has been described as a shift from 'mechanical' medicine' to 'informational' medicine (Nettleton, 2004). This shift has involved less of a reliance on the haptic (touch) and the concept of medicine as an 'art' to a focus on generating and using data on the human body, on the part of both medical practitioners and of patients. It is assumed that more information necessarily will lead to better healthcare and economic efficiencies, both by encouraging patient engagement and self-responsibility for their health and providing healthcare services with the data they need to improve medical care and service delivery (see, for example, commentary by Swan, 2012; Topol, 2012; Dentzer, 2013).

Advocates of digital health technologies argue that 'consumers' are an integral part of the 'digital revolution' that they predict is about to occur in healthcare, and that these 'consumers' should play an active part in 'digitising' their bodies (Topol, 2012). Indeed, one of the central features of digital medicine is the individualisation of detailed data that may be produced. It is asserted that the more detail about their physiology, everyday habits and genetic makeup individuals are able to access, the better they will be able to perform as 'activated' or 'engaged' patients (Swan, 2012; Topol, 2012). Here is a new vision of the 'digital archive' of the body (Waldby, 1997): patient bodies that are 'digitised' and therefore ready to become 'engaged' and 'activated', to 'take control' of their health and to produce their own data on themselves and share these data with others as well as access the data produced by medical testing and medical records.

The concept of the digitally engaged patient has implications for the spatial dimensions of healthcare. The clinic and the normalising and assessing gaze of healthcare providers are incorporated into the everyday domestic spaces and practices of the lay person via these technologies. As is the case of previous forms of telecare, many of the new digital health technologies are directed at repositioning healthcare, locating it within the domestic domain rather than the clinic and moving physical encounters of patients with healthcare providers to virtual encounters (Mort *et al*, 2009; Oudshoorn, 2011, 2012). As a consequence, the home becomes one node of a dispersed network of healthcare technologies in multiple sites and involving multiple actors who interpret the data supplied by telecare patients, diagnose and prescribe treatments and answer patients' queries. As such, the 'medical gaze' is fragmented and distributed over different actors and locations (Nicolini, 2007; Oudshoorn, 2011, 2012) as part of the phenomenon Nettleton and colleagues refer to as 'e-scaped medicine' (Nettleton, 2004).

Discipline and Resistance

Digital health technologies have disciplinary as well as surveillant capabilities. They make specific demands of patients, requiring them to engage in self-monitoring practices at certain times of the day, for example, or beeping to remind them to take medication, or requesting them to rate and rank their healthcare providers on an evaluation website, or to upload their personal experiences of illness and medical treatment on patient support websites. In the discourse of the digitally engaged patient, therefore, 'empowerment' becomes a set of obligations (Veitch, 2010).

Thus, for example, research on Dutch heart patients using telemedicine devices such as a system to measure their body weight and blood pressure, a mobile phone capable of conducting and transmitting an ECG and a device to diagnose heart-rhythm irregularities found that patients' bodies and home environments were disciplined by the routines expected of them. They were expected to conform to precise daily schedules of monitoring their bodies and sending data to their healthcare providers and respond to messages and indicators sent to them at various times daily (Oudshoorn, 2008, 2009, 2011, 2012).

Patients may value these technologies as a way of avoiding a visit to the doctor when they would rather not see them face to face, and thus establish a distance from medical surveillance (Andreassen *et al*, 2006). Conversely, they may find the obligation of self-surveillance overwhelming, forcing them to confront their illness, engage in routine actions they would rather avoid or deal with digital

interactions that are tiresome. Some patients respond to the disciplinary and surveillance imperatives of self-care and self-monitoring by resisting or evading healthcare providers' directions and the obligations expected of them. Individuals may have other priorities and thus simply fail to use the devices provided to them in the ways expected of them. Patients may 'play the system', experiment with their therapies or withdraw information from the healthcare providers if it does not conform to expectations (Nicolini, 2007).

Patients' resistance to the use of digital health devices for self-care is often explained by such factors as incompetence, indifference, ignorance or even technophobia on the part of older people in relation to using these technologies. However, even younger people who are more experienced in the use of digital technologies more generally may resent, challenge or simply ignore the tasks and responsibilities demanded of them by telemedicine (Oudshoorn, 2011). Some people prefer to engage in physical rather than virtual encounters with healthcare providers, wanting what they view as a more personal interaction, in addition to using telemedical technologies for some purposes (Mort *et al*, 2009; Oudshoorn, 2011).

The techno-utopian ideals of the technologies used for these purposes are frequently challenged in the lived experiences of the patients who use them. Mol conducted a study of Dutch people with diabetes who were required to monitor their blood glucose levels regularly throughout the day. She notes the complexities and difficulties of using self-monitoring technologies and in interpreting the data produced: 'in practice daily care turns around messy, material, smelly, bloody, frightening, or tedious activities that tend to be difficult to do (for professionals as well as patients)' (2009, pp. 1756–1757). Mol (Mol and Law, 2004; Mol, 2009) goes on to point out that attempts to exercise control over the diabetic body, including using monitoring and self-care devices, are doomed to fail, simply because of the vagaries and erratic nature both of the body and the technologies designed to assist people take control. As she argues, '[t]echnology is never quite tamed. It doesn't offer control, and it changes along with the other elements of daily care practices' (Mol, 2009, p. 1757).

The Emotional Dimensions of Self-Care and Self-Monitoring

As in discourses attempting to represent the patient as a 'consumer' in earlier eras (Lupton, 1997a), contemporary writings on patient engagement assume a rational, emotionally disengaged 'empowered' subject who is motivated and equipped with the economic and cultural capital to engage in self-monitoring and self-care (Oudshoorn and Somers, 2006; Mort *et al*, 2009; Andreassen and Dyb, 2010; Oudshoorn, 2011). As sociologists of health and illness have argued

for some decades, these representations fail to acknowledge the mutual dependencies, ambiguities and ambivalences of the doctor–patient relationship, the fact that lay people are often feeling highly vulnerable when they need healthcare. Particularly if they are elderly, from a socioeconomically disadvantaged or marginalised social group or very ill or suffering severe pain, patients may find it difficult to challenge medical authority or simply do not wish to do so (Lupton, 1996, 1997a,b; Greener, 2003; Andreassen and Trondsen, 2010; Salander and Moynihan, 2010). There may be very strong emotional investments in allowing one's doctor to 'take control' when one is ill, suffering or anxious about one's health. Lay people frequently shift between adopting a consumerist perspective and wanting to invest their trust in their doctor, depending on the context (Lupton, 1996, 1997a).

Sociological research has further identified the emotional investments that may be an integral dimension of self-care practices facilitated via digital technologies. Norwegian researchers (Andreassen *et al*, 2006; Andreassen and Dyb, 2010; Andreassen, 2011) found that patients may appreciate the benefits offered by using telemedical technologies for communicating with healthcare professionals, particularly if they find it difficult to travel to seek face-to-face medical attention. However patients' trust in their healthcare providers remains an integral aspect of such use: without trust communicating via technologies would not be effective. Indeed, trust may be even more important than in a face-to-face medical encounter, given the less personal nature of digital communication (Andreassen *et al*, 2006).

Many studies have demonstrated that the lived reality of tracking one's illness and engaging in self-care can simply be too confronting, tiring or depressing for people who are chronically or acutely ill. Self-monitoring and self-care for health and medical purposes become part of the burden of treatment with which patients are confronted. For example, Oudshoorn (2011) found that some of the heart patients she studied who resisted using these technologies did so because they did not wish to have a constant reminder that they were ill and they resented the task of monitoring themselves constantly or having their homes transformed into a medical clinic. The surveillance offered by these technologies were thus positioned by these 'non-users' as restrictive of their autonomy, contributing to anxiety about their health or detracting from their preferred sense of selfhood and embodiment.

Not all patients, however, resist or resent using monitoring technologies. While some users may experience self-monitoring or self-care technologies as restrictive and constraining of their autonomy, for others these technologies afford the possibility to evade the medical gaze, take control over one's illness and one's wayward body or achieve independence. Several researchers have explored the use of digital health technologies by older people, including such

monitoring digital devices as motion detectors, tags or badges for people with dementia so that their movements might be kept track of without the need for physical restraints, sensors in beds and chairs, which are able to monitor sleep patterns, weight and movement in individuals living in residential care and 'smart floors' that can detect if a person has fallen. These researchers have concluded that although these technologies raise questions about bodily constraints, ageism, power relations and inequities, they may also be regarded as enabling and empowering devices that are able to assist older people achieve better mobility, independence and feelings of security and allow them to achieve their goal of living at home longer (Brittain *et al*, 2010; Joyce and Loe, 2010; Loe, 2010; Long, 2012).

Some studies have shown that when patients believe that better knowledge of their bodies is achieved via self-monitoring devices they feel as if they are more in control, and this leads to greater security and reassurance. However, if the data they produce suggest that their health is suffering, or if these data conflict with their own subjective and phenomenological interpretation of their state of health and wellbeing, this can be unsettling and anxiety- or fear-provoking. As another Dutch study of people with diabetes found (Hortensius *et al*, 2012), whereas some of the interviewees described the self-monitoring technology as a 'friend', bestowing peace of mind, confidence, freedom and certainty, others represented it as a 'foe'. They disliked having to prick their finger constantly to elicit the blood for the test, and feeling ashamed, anxious, helpless or frustrated by glucose readings that were not in the appropriate range.

Similarly, Danish research (Huniche *et al*, 2013) investigating patients' experiences with self-monitoring their chronic obstructive pulmonary disease at home found that the biometric readings these patients produced on their bodies, such as their oxygen saturation levels and lung function, were valued for their objectivity, their ability to uncover the mysteries of their bodies. The patients responded emotionally to the numerical data they produced, feeling encouraged, more secure or reassured when the numbers were in the acceptable range, but experiencing anxiety, depression or fear of physical deterioration when their data exceeded this range.

Implications for Professional Practice

Digital health technologies also have profound implications for the embodied practices and professional identities of healthcare workers. Research on tele-medical technologies has demonstrated that healthcare professionals find it difficult at times working with digitised virtual bodies that are at a physical distance from them and mediated via technologies,. They must deal with not

being able to use their senses as they would when viewing and touching patients or employing their localised and intuitive knowledges to assess the patients' wellbeing, instead relying on virtual representations of the fleshly body: images or metrics (Mort *et al*, 2003; Oudshoorn, 2008; Dyb and Halford, 2009). Whereas certain types of information are gained via digital technologies, other types are lost (Mort *et al*, 2003).

Mort and Smith (2009) remark upon the mythological status that information/data has obtained in healthcare discourses and policies, noting that knowledge and action in healthcare delivery are often achieved in spite of rather than as a result of information systems. They point out that the methods used to obtain data in the telecare setting structure what is recorded and what is not within stringent limits. The healthcare workers working in this system often struggle with and rework the information they gather or are provided with in their attempts to diagnose and treat patients, seeking to add greater contextual information to these data. Their medical judgement is based on interpreting multiple and often conflicting heterogeneous streams of incomplete data.

As this suggests, much 'invisible work' (Mort and Smith, 2009) goes into translating digitised images and metrics sent from other locations and 're-embedding' the information into a context in which it is will be used. Digital data, like any other kinds of data, must be interpreted, made sense of, located within existing knowledges and data sets and negotiated (Mort *et al*, 2003; Coopmans, 2006; Oudshoorn, 2008; Mort and Smith, 2009; Oudshoorn, 2011). The spatial, historical and political contexts in which data are gathered and interpreted also require acknowledgement. The wider network of relations (including other technologies) within which healthcare workers operate and the constraints posed by these, the dominant orders and power relations of medical work and the professional identities that are invested in these and the locational dimensions of healthcare practice challenge the assumptions that underpin the use of digital technologies in healthcare (Dyb and Halford, 2009; Halford *et al*, 2010).

The newer digital health technologies, as well as continuing to negotiate all of these issues, also raise other difficulties and complexities. Concerns have been raised about how patients and healthcare providers will be trained to use such technologies and how the reams of data that lay people may collect on their health from self-monitoring technologies can be used by healthcare providers (Gruman, 2013; Malykhina, 2013; Ringquist, 2013). Some doctors and healthcare institutions are also concerned about the boundaries between patient and doctor breaking down and patient privacy issues in relation to the use of social media (Thielst, 2011). In relation to patient ranking sites, it has been argued that views expressed on healthcare ranking sites might be unrepresentative and that healthcare providers may 'game' the system by giving positive ratings to

their own service or denigrating a rival service (Greaves *et al*, 2013; Rozenblum and Bates, 2013).

Discussion and Conclusion

Digital health technologies and the disciplinary regimes they configure as part of the practices of self-monitoring and self-care may be said to both empower and disempower patients. The spatial distance these technologies enact allows patients to avoid the direct medical gaze and disciplinary power that was the focus on Foucault's writings on the clinic. However, this medical gaze becomes virtual and moves towards self-government, as patients are expected to turn the gaze upon themselves and then report what they observe to their healthcare providers. Not only has the clinic moved into the home, it has dispersed to every possible spatial and temporal location. Not only are medical and health-related data now mobile (Coopmans, 2006), but so are the bodies/devices that produce these data.

Discourses of the digitised and digitally engaged patient may be viewed as part of a neoliberal political orientation to patient care and preventive health. They position lay people as ready and willing to actively engage in their own healthcare and promote their own health, in the attempt to shift the burden of such responsibilities from the state to the individual (Lupton, 1995, 1997a; Mort *et al*, 2009; Veitch, 2010). Such discourses also participate in a more general privileging of the measurable and the quantifiable in contemporary societies, where collecting as much data as possible on patients and healthcare provision underpins a more general effort on the part of governments and commercial entities to gather what is often termed 'big data' on populations via digital media technologies to inform service delivery (Beer, 2009; Cheney-Lippold, 2011; Ruppert, 2011).

In the context of the patient assemblage configured via discourses of digitisation, individuals' knowledge of their bodies that can be provided by data is privileged over the haptic sensations they feel from their bodies, and represented as able to uncover hidden illness or disease that might otherwise not be detected using phenomenological experiences of embodiment (Lupton, 2012, 2013). The 'digital' is conflated as the 'metric', privileged for its objectivity and the presumed insights it can provide into previously unknown dimensions of patient experience and embodiment. Discourses on the digitised patient suggest that order and control over what might otherwise be an unpredictable (because unknowable or mysterious) body may be instituted via digital and metric knowledges. Data, metrics and algorithms are represented as clean, contained and unemotional, far removed from the messy contingencies and uncertainties of the

body and its ills and the distressing or unsettling emotions associated with these. Both patients and healthcare providers are implicated in these new algorithmic assemblages (Cheney-Lippold, 2011), as lay people's bodies and behaviours and healthcare providers' quality of service and expertise are monitored, computed, metricised and configured.

The research reviewed here has demonstrated that lay people may use digital health technologies in diverse and sometimes contradictory or ambivalent ways. It is not simply a matter of either taking up or rejecting these technologies: many people move between these two positions. Some technologies are embraced on some occasions, whereas others may be rejected or resisted. Their meanings and uses are not stable but rather are subject to change and contestation, depending on the context in which they are located and the other actors with which they interact.

Self-care and self-management of one's medical condition and the 'empowerment' they are supposed to offer only go so far, however. The technologies themselves play a structuring role in delimiting action on the part of patients. Patients have not been consulted about the policies, design or use of the technologies they are given and are still in practice positioned as passive targets of these technologies. While they are responsible for collecting the data on their bodies that they transmit to healthcare providers, it is the latter who interpret and use the data (Mort *et al*, 2009; Oudshoorn, 2011). Patients are still expected to conform to healthcare providers' expectations and it is the providers who are positioned as possessing the legitimate knowledge of their condition and how best to treat it (Nicolini, 2007; Veitch, 2010).

Much remains to be investigated in relation to the interaction of concepts of digital patient engagement and the politics of the data that are configured as part of lay people's interactions with digital health technologies. For example, what types of subjects, bodies and relations (both to other humans and to objects) do digital media technologies enact? How will the power relations of the medical encounter be transformed (or not) via these technologies? How do the various forms of digital data that are produced both as a by-product of people's use of digital health technologies and more deliberately as part of their participation in blogs or patient support platforms interact with each other?

One intriguing direction for research in relation to the concept of the digitally engaged patient is that which pursues investigation into the embodied and affective dimension of digital technology use. As noted above, patients often invest the medical encounter with emotion, particularly if they are suffering and desperate for help. When the medical encounter is mediated via digital media devices, emotion may be invested in the devices themselves as well as the social relationships that are established via the devices between users and their healthcare providers or with other patients. This issue of emotion can be

reintroduced by exploring the ways in which lay people's appropriation of digital technologies involves both affective attachments to the material devices they are using (such as their smartphones or wearable self-monitoring devices) and to the other people with whom they are sharing their data or whose professional services they are ranking.

Now, more than ever, as the new digital media technologies become ever more mobile and wearable, as we carry them on our bodies throughout the day or even throughout the night – indeed as some can now be swallowed or stuck upon one's skin as paper-thin patches – they are becoming part of us, part of our bodies as prosthetics of the self, part of our identities as they store more data about our experiences, our social relationships and encounters and our bodily functioning (Lupton, 2012, 2013). These inquiries go beyond a preoccupation with the question of whether technologies are used or not (as is evident in the discourses of the 'digitally engaged patient') but *how* they are used and actively incorporated into everyday life; how they are 'remade' via embodied use.

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