Turn to the Self in Human-Computer Interaction:

Care of the Self in Negotiating the Human-Technology Relationship

Yubo Kou
School of Information, Florida State University
Tallahassee, FL, United States
ykou@fsu.edu

Xinning Gui, Yunan Chen, Bonnie Nardi
Department of Informatics, University of California, Irvine
Irvine, CA, United States
{guix; yunanc; nardi}@uci.edu

ABSTRACT

Everyday life is increasingly mediated by technology. Technology is rapidly growing capacity and complexity, especially evident in developments in artificial intelligence and big data analytics. As human-computer interaction (HCI) endeavors to examine and theorize how people act and interact with the ever-evolving technology, an important, emerging concern is how the self—the totality of internal qualities such as consciousness and agency—plays out in relation to the technology-mediated external world. To analyze this question, we draw from Michel Foucault's ethics of "care of the self," which examines how the self is constituted through conscious and reflective work on self-transformation. We present three case studies to illustrate how individuals carry out practices of the self to reflect upon and negotiate their relationship with technology. We discuss the importance of examining the self and foreground the notion of care of the self in HCI research and design.

CCS Concepts

• Human-centered computing → **Human computer interaction (HCI);** *Empirical studies in HCI*

KEYWORDS: Care of the self; Foucault; ethics; power; existential HCI; political economy; politics; neoliberalism; censorship; quantified-self; healthcare

1 INTRODUCTION

Technology, especially digital technology, is often envisioned and framed as enhancing aspects of human beings such as knowledge, health, and wellbeing. However, studies of technology have long questioned the politics of and values inscribed in technology design [76,100]. There is increasing appreciation that people are experiencing various implications of technological advances, both individually and collectively, manifested in increasing societal and academic concerns such as algorithmic bias [60], privacy breaches [26], and online disinformation [93].

Human-computer interaction as a discipline is concerned with these challenges and strives to understand the shifting human-technology relationship. Among these concerns, a currently underexplored dimension is the self, concerning the integrity of the individual with internal qualities such as knowledge, agency, and happiness. Self is a term sitting at the intersection of diverse relationships of selfhood, identity, agency, power, and governance. In this paper, we explore how technology plays a role with respect to the self, or the constitution of the self. The technology we discuss in this paper is not constrained to any single form of digital technologies. Rather, it leans towards a broader sense of "technique," what Jacques Ellul described as "rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity" [23]. Technology can be viewed as a constituent of structure recurrently enacted through social process [81].

Several separate areas of interest in HCI align with this question. Personal informatics research [44,64] explores how self-tracking systems might provide rich and efficient data analysis so that users acquire better knowledge about, e.g., health and life. The literature on online disclosure [54,62,98] examines how digital technologies support presentation of the self, as well as its social utilities such as social approval and social support. Empirical work and design efforts have explored various self-driven practices in order to enhance knowledge about the self, such as self-reflection [15] and introspection [59]. However, existing

research that concerns the self often leans towards stressing the functionalities of technology as a medium for delivering messages, or a tool with explicit affordances. In this view, technology is effectively managed and appropriated at will.

Critical voices speak against viewing technology and design as neutral, emphasizing power relations when examining technology and design. Power relations in this context refer to relationship in which one exerts control over the conduct of another [32]. For example, feminist HCI concerns how interaction design is imbued with existing power relations that construct gender [6,7]. Studies of social justice in computing systems ask how design might avoid perpetuating issues such as discrimination and bias [21]. Participatory design [77] stresses involving all stakeholders in the design process, attempting to flatten the power structure. However, these critical stances tend to highlight the role of social or technical structures in shaping the self, thus discussion of how agency is exercised in the constitution of the self has been a missed opportunity.

In this paper, we turn to Michel Foucault's ethics of "care of the self" to investigate the self in human-computer interaction. Care of the self, as we shall discuss in detail later, denotes "an exercise of the self on the self by which one attempts to develop and transform oneself, and to attain to a certain mode of being" [32]. The certain mode of being refers to "a certain state of happiness, purity, wisdom, perfection, or immortality" [33]. We suggest that the notion of care of the self, by stressing self-transformation in response to external structure, is highly relevant to critical theoretical development in HCI that explores themes of power relations, exploitation, and oppression, as well as the growing empirical evidence that reveals ramifications of technological innovations over the self.

Following a case study methodology [101], we present three case studies to demonstrate how the notion of care of the self could serve as a starting point in rethinking the human-technology relationship and providing reflections on design. The first case concerns how citizens construct self-knowledge in a highly censored media environment in China. The second case concerns how video game players deal with quantification technology that monitors and regulates their gameplay. The third case concerns American parents with children under the age of two who are negotiating a fragmented healthcare system through constructing situated knowledge.

Through these three cases, we trace how large social, cultural, and technical systems and structures, mediated by technology, impose knowledge, either popular or official,

onto individuals. We studied how individuals came to the realization that they must manage care of the self, either proactively or reactively, and how individuals enacted individualistic, bottom-up practices in order to negotiate relationships with technology. We highlight individuals' constant self-examination and introspection in interactions with structural elements in which technology plays a large part. Building upon these three cases, we move on to discuss how the notion of care of the self invites critical reflections upon the framing of technology in relation to the self, agency, and human wellbeing. Joining strands of critical theories in HCI, we seek to highlight the work of the self on the self in managing technology at different scales ranging from a single technological point to larger system thinking.

2 CARE OF THE SELF AND ITS RELATION TO HCI

The ethics of care of the self represent a significant turning point in Michel Foucault's long-term investigation into how the self is constituted in relation to the efforts from the subjects and the influence of the external structure, or power relations [10,20]. *Power* is a loaded term with many contested concepts and discussions in disciplines such as philosophy, sociology, and political science, and is of relevance to HCI. A 2018 survey of CHI papers discussing power or empowerment distinguished between two fundamentally different notions of power: *power-to*, meaning the ability to act, and *power-over*, concerning relations between actors [88]. In this paper, the power that we are discussing belongs to the second category and is inherently relational.

In Foucault's early, more renowned works such as *Madness and Civilization*, *The Birth of the Clinic*, and *Discipline and Punish: The Birth of the Prison*, Foucault discussed how power relations produce subjectivities through institutional regulations, monitoring, and discourses [28,35,36]. Power is as prevalent as human relationships in contexts ranging from communication to sexual, institutional, and economic occasions. Power relations exist at different levels, in different forms. They are mobile, modifiable, and flexible [32].

Power and knowledge are inherently inseparable. Power produces and transmits knowledge, which in turn reproduces power [37]. For example, prisoners are controlled through observation and judgments, but also are told what they know and whether they are behaving as expected. Those in control establish standards and criteria which serve as a basis for knowledge. HCI researchers often

refer to Foucault's analysis of Bentham's Panopticon as a mode of power/knowledge [51,83,85].

The proposition of care of the self marked what many scholars considered as Foucault's ethical turn in the trajectory of his thought [17,49]. Instead of insisting on the totalizing effect of power/knowledge, he returned to an ancient conception of ethics where a person examines and reflects upon the self, not just following, but also problematizing, moral rules [47]. From this point, Foucault sought to rethink the subject, and the constitution of the subject. The subject is still situated in complex power relations [30]. However, the subject is not simply constructed by power, but actively partakes in the construction of power, and, thereby, modifies himself or herself [47]. Foucault thus stressed, in writings and interviews, the idea of self-cultivation, or the constant practice a person carries out to cultivate the self. Such practices denote "models proposed for setting up and developing relationships with the self, for self-reflection, self-knowledge, self-examination, for the decipherment of the self by oneself, for the transformations that one seeks to accomplish with oneself as object" [31].

Foucault analyzed classic practices of the self throughout history [33]. For example, Socrates initiated dialogue to force self-examination on not only himself, but also the citizens of Athens. Foucault considered this an orientation towards care of the self because "the themes of contemplation of self and care of self are related dialectically through dialogue" [33]. However, Foucault noticed the disappearance of the dialectical structure in history, where stoics often practiced three techniques of the self, including letters to friends where a person discloses and reflects upon the self; examination of the self and conscience as to what was done and what should have been done; and *askesis*, through which a person discovers, absorbs, and transforms truth in order to take actions [33]. Lastly, Foucault discussed how confession and self-renunciation in Christianity allow a person to discover the hidden thought under the examination by the teacher/master [33]. Through these practices of the self, a person could know and govern the self.

While Foucault's inquiry was focused primarily on Western practices, he acknowledge that care of the self exists in every civilization, and is "suggested or prescribed to individuals in order to determine their identity, maintain it, or transform it in terms of a certain number of ends, through relations of self-mastery or self-knowledge" [34].

The notion of care of the self is not new to HCI research. Lupton discussed how care of the self is pertinent to understanding self-tracking and quantified self practices [70]. She suggested that self-tracking could be viewed as a strategy and discourse that prescribes what the ideal individual should do and be [70], and that care of the self stresses investigating the rationalities underpinning the techniques that people use to understand themselves, rather than accepting them at face value [70]. However, this paper concerns technology in a broader sense, including not only computing devices but also large, complex sociotechnical systems. As such, our analysis focuses primarily on interactions between the self and its external environment.

Related to discussions of self-tracking, and situated at the intersection of health and HCI, researchers have long studied self-care [11,80]. Here the notion of self-care, much disputed as Nunes and Fitzpatrick noted [80], stresses mostly how people manage their health conditions. At a deeper level, both self-care in health and care of the self are concerned with the neoliberal rationality that expects individuals to be responsible for themselves (which we discuss in Section 3.3). However, self-care has focused specifically on health, and the utilities of technologies in this practice, while care of the self allows us to critically examine technology's power acting on us.

To analyze experiences of intimacy in the virtual world *Second Life*, Bardzell et al. [5] drew upon the notion of care of the self's dual perspectives towards the constitution of the self, that is, one person both becomes subjected to external power relations, and carries out work on his or her self. They showed that the way their participants worked within the governance system of *Second Life* was not merely constraining but also generative, allowing them to emergently and reflexively construct their identities. Our paper is focused on the subject's rediscovery of relationships with technology as a way of constructing self-knowledge, as well as actions to negotiate such relationships.

3   RELATED THEORETICAL WORK

The application of care of the self in this paper is related to several theoretical or critical strands of work in HCI.

3.1   Existential HCI

Existentialism was considered highly relevant in Foucault's trajectory of thought and later discussions of care of the self [19,27]. From an existential perspective, Kaptelinin observed that, "human existence is characterized by a quest for authentic being and making one's life meaningful. The

quest, for which each individual is ultimately responsible himself and herself, opens almost limitless opportunities for self-actualization, but is also inherently dramatic" [53].

"Existential HCI" was proposed by Light who observed the pervasive intervention of digital technologies into all aspects and every stage of ordinary life. She called for a phenomenological inquiry into the meaning of particular technologies in use in the context of those seeking to make sense of them [66]. For Kaptelinin, existential HCI tries to expand the scope of HCI to understanding the most personal uses of technology [52]. So Kaptelinin defined existential HCI as:

Existential HCI is a perspective in HCI research, which is concerned with investigating possible effects of digital technologies on human experience of existential issues, as well as identifying potential uses of interactive technology to support individuals in dealing with existential questions. [52]

Light's commentary proposed to understand human-technology relationships as defining humans as groups, individuals, and societies. Existential HCI studies "redefining of human experience in an increasingly (digitally) technologized and mediatized environment" [67].

In discussing existential crises and design, Light et al. [68,69] criticized what they considered as "institutional humiliation," including prioritizing system efficiency over sensitivity; techno-paternalism; collection and analysis of personal data that dominate decision making; and addictive online content such as gambling and shopping [68]. In many ways, discussion of such institutional humiliation inspires us to explore possible actions and turn to Foucault's care of the self.

3.2   A Political Economy Perspective in HCI

In tracing the self in its relation to technologies, we are also concerned with how ordinary individuals labor in their interactions with complex systems. Therefore, we turn to the work on the political economy of technologies.

In contrast to those framing the Internet as a site of resistance, Terranova sees it as a mutation totally immanent to late capitalism. For example, the voluntary work that people perform, such as moderating online forums and content production, is "free labor" subject to capitalist exploitation [94]. More recent approaches examine how platforms harvest and commodify user data for the accumulation of capital [40,89]. The combined themes that "technology pervades the most intimate parts of our world" [66] and the capitalist rationalities behind

everyday life technology are concerns we take on as we examine care of the self.

Ekbia and Nardi discussed how the Marxist political economy could engender critical reflections upon larger socioeconomic issues beyond self-constrained HCI problems [22]. A political economy perspective, they argued, is important to understand specific issues such as changing labor relations, means of production, and how a digitalized political economy impacts aspects of life such as health and environment [22]. Specifically, for HCI, such perspectives mean that HCI researchers engage with political economy through 1) *historicizing*, keeping in mind that the capitalist system has re-invented itself along technological advances, 2) *contextualizing*, engaging beyond local context, and 3) *politicizing*, acknowledging that technologies are inherently political. A 2018 CHI workshop critiqued "the mainstream HCI community['s orientation] around neoliberal capitalist visions of a hi-tech future," and called for a systematic approach to the end of capitalism and designing to support a post-capitalist world [25].

Foucault was concerned with neoliberalism. To him, neoliberalism differs from classic liberalism in privileging market freedom over state regulation [63]. As such, neoliberalism expects each individual to be a responsible subject, and to assume economic rationality in all aspects of life such as health, learning, employment, and governance [38]. Therefore, it is even more urgent that our analysis examines individuals' capacity for self-care and how this is linked to forms of technological and social structure [63].

3.3   The Politics of Technology

Winner's original work on the politics of artifacts [100] has been influential in science and technology studies (STS) and many other fields to critically examine the so-called "neutrality" of technology and inscribed values in technology design. For example, studies of infrastructure pay attention to the invisible work that often goes unnoticed or not formally recognized [90,91]. Bowker and Star investigated how classification systems might oppress, misrepresent, and marginalize certain groups [12].

Brey analyzed how technology could contribute to empowerment and disempowerment, as well as possible resistance strategies through technology [14]. Monahan's examination of technologies of deception such as untrustworthy workplace thermostats and governmental collection of mobile phone data warned about "imbalances in power and widespread acquiescence to corporate and state efforts to control individuals, groups, and their data" [76].

Recently researchers have started to examine oppression and politics within technologies at various scales. For example, platforms such as Reddit, Facebook, and YouTube often combine a variety of functions that work together to produce adverse effects, such as propagation of false rumors and disinformation [92] and generation of toxic culture [73]. Others have looked into algorithms that perpetuate discrimination and bias [79]. Still others asked questions about oppression in big data analytics [74,95].

4   METHODOLOGY

We follow a case study methodology [101] to explore the notion of care of the self in interactions between people and technology. This methodology denotes an empirical inquiry that investigates a phenomenon within its real-life context especially when the boundaries between phenomenon and context are blurry, combining heterogeneous data sources such as observation and interview, and prior development of theoretical propositions [101]. Next, we explain the conception of the motivation of discussing the notion of care of the self in the context of HCI, data collection, and data analysis, in light of reflexivity [87].

The idea of writing this paper emerged through discussions of the authors who led different projects but shared common interests in empirical research on the interplay between agency and external environment. It became our common recognition that care of the self is a theme that could be traced in scenarios where interactions take place and have an effect on people's inner selves, but we had not systematically examined care of the self in the projects. We selected three projects whose contexts could complement each other in terms of populations, characteristics of technology-mediated governance, and practices of the self.

In the first project, Kou and Nardi investigated how Chinese citizens used technology to seek information and develop political opinions in mainland China. Between April 2014 and January 2016, Kou, a native speaker of Chinese, conducted 32 semi-structured interviews with mainland citizens as well as several months of observation of social media discussions around major political events in China. While the project has concerned primarily with participants' attitudes towards censorship and their strategies to obtain quality information (see [57,58]), an underexplored angle was how to theorize the complex relationship participants formulated with censorship in terms of what constitutes knowledge of political events and knowledge of a censored self.

The second project, led by Kou from October 2011 through the present, is a multi-year ethnographic study of player culture in League of Legends (LoL), one of the largest video games in the world [84]. LoL is a team-based, session-based game. Play is highly competitive and fosters a game culture where many players strive for ever-higer rankings [56]. Like other games [1], LoL supports a culture of monitoring and surveillance: it publicizes all of its players' gameplay data through APIs. Consequently, numerous third-party quantification tools emerge providing rich statistics about player performance, allowing players to monitor each other's performance. Kou and Gui's interview study with LoL players [55] discussed the key role of quantification in informing players of their own play and providing them more information about their teammates. Participants reported negative consequences of problematic quantification use such as stress and in-team conflict.

The third project by Gui and Chen concerns individuals' interactions with the U.S. healthcare system. From 2016 to 2018 they conducted 30 narrative interviews with 27 mothers, one father, and two mother and father dyads to understand how parents of young children interacted with the healthcare system. to obtain proper care for their children under age two (see [45,46]). The project revealed how study participants encountered various breakdowns such as misdiagnosis and unexpectedly large bills, how they figured out workarounds to problems, and improved their skills in interactions with the healthcare system. A consistent theme was parents' constant work on improving their own knowledge and expertise.

With care of the self as our theoretical framework, we conducted deductive thematic analysis [13] upon interview transcripts and field notes from the three projects. The first and second authors each went through data to code for forms of power enacted through technology and the ways it acts upon people, as well as the concrete practices of the self and how participants cultivated these practices. The granularity for data analysis ranged from a few words to paragraphs, depending upon when an idea was fully expressed. After basic codes were assigned, the two coders used several rounds of discussions to consolidate codes and develop themes. We selected representative quotes when presenting findings.

5   THREE CASES OF CARE OF THE SELF

We use these three diverse cases to illustrate the prevalence of care of the self in individuals' negotiation with their technology-mediated surroundings. The first case examines individuals' critical examination of censorship technologies

and attempts at circumvention. The second concerns how individuals negotiate with self-tracking technologies in a game community. The third discusses struggles with a healthcare system based on neoliberal values.

5.1 Panoptic Technologies and Individual Choice

The Chinese government closely monitors all traditional media such as newspapers, film, radio, and television programs. Internet censorship, or the "Great Firewall," is widely known to be comprehensive, strict, and advanced. It employs numerous means at different levels, including cyber-attacks targeted at individual activists and dissidents, technical control built into household routers and Internet servers, surveillance, content deletion, closure of websites, paid commentators, cyber security laws [72], and Internet police [65]. To comply, Internet companies in China enforce even stricter censorship on their own platforms to make sure they don't run afoul of laws [50,71]. A social media user in China commonly encounters censorship techniques such as sudden removal of websites for no reason, and sensitive keywords being forbidden in social media posts or online searches [71,86]. Our analysis considers this expansive censorship apparatus as a set of panoptic technologies, and explores whether and how care of the self is exercised.

5.1.1 Panoptic Technologies. The expansive censorship in China manifests state power domination over citizens. It establishes and enforces rules and constraints for use of traditional media and digital technologies to seek information about public or political events. It resembles the panopticon in Foucault's analysis [28] in that it seeks to create a disciplinary society whose members are reminded that they are being watched. In doing so, it sustains a knowledge basis for establishing a version of truth that it accepts, for propagating values and logics aligning with its own, and for fending off conflicting ideological viewpoints.

Our study participants frequently experienced these measures of control. Most encountered keyword blocking and content deletion on social media on a daily basis, especially during political events such as annual meetings of the legislature, where online discussions of particular members are strictly forbidden. A participant expressed a constant fear that "we are mostly fine but who knows if someday you will be reported for something you write online and a policeperson knocks on your door."

The agenda of censorship, according to one participant, is to depict a picture that "our country is doing extremely well and the party is very responsible for its people." Foucault used "regime of truth" to stress that each society has its

own game of truth that builds upon acceptable discourses, mechanisms to distinguish what is true or false, and techniques for according value [29]. In this regard, censorship helps the government to sustain a version of truth about itself, setting up expectations and perceptions of the citizens.

5.1.2 Individual Choice. Participants perceived the totalizing effect of censorship and the fear it engenders. However, with awareness and tech-savviness, they explained how they could make individual choices at two interrelated levels: their concern for truth and their relationship with digital technologies. First, they were cautious when interacting with digital technologies, knowing that they certainly contained a censorship component. Therefore, they knew they could not rely upon one single technology (e.g., a single social media platform), because each technology entailed a certain combination of corporate values and state propaganda. For example, one participant criticized Weibo, the largest microblogging service in China, for "heavy editing" and "allowing purchase of a position in trending topics." Therefore, when participants wanted to better understand a specific political event, they needed to examine and understand their relations with their surrounding immediately accessible technologies, and use such knowledge to reconfigure their own technological paths to a more comprehensive set of information.

To achieve this, participants mentioned a number of means of reconfiguring. First, they could diversify their information sources beyond domestic ones to include a number of foreign news websites and social media platforms to compare and synthesize different narratives and viewpoints. Second, they could rely upon a specific order of technologies to circumvent censorship. For example, many participants mentioned using virtual private network software to access Twitter and Facebook. which are blocked in China. Lastly, participants perceived private communication channels such as instant messaging and email as more secure, and use them to share sensitive information with others. One of our participants asked her friend who studied abroad to forward sensitive information through email. This list of ways of reconfiguration is not meant to be exhaustive, but to suggest that, while the panoptic measures were implemented on a number of individual platforms and tools, participants could still devise combinations of technologies and people in specific orders to obtain desired information for the purpose of cultivating their own knowledge. Through this recurrent use of technologies and creative reconfiguration, participants grew competence in technology use.

Participants were aware that all the information that they had direct access to was likely to have been deliberately tailored to sustain a certain truth. They had to decide whether the endeavor to rediscover truth in line with their own views was worth the effort. The reconfiguration of technological paths took a lot of time, and participants could not spend all their time pursuing a better understanding of every single event. For topics that they were not interested in, they remained suspicious of domestic narratives and acknowledged their limited knowledge of them.

5.1.3 Summary. In this case, care of the self manifested as participants' individual choices, where they exercised a degree of freedom even in such THE stringent power structure of heavy censorship. Through various practices of the self, participants sought to reject the normalizing effect of the censorship apparatus, and cautiously negotiated their relations with censorship technologies. They exerted their agency to constitute selves as reflexive, careful, and creative individuals who did not simply accept logics of censorship and government narratives.

5.2 Culture of Quantification and Self-Reflexivity

In the second case, we move away from the totalizing, inescapable panoptic technologies, to discuss an online culture that is largely constrained to a game community. In this case study, we analyze players' relations with quantification tools in LoL (Figure 1 shows a screenshot of a player's quantified performance).

5.2.1 Culture of Quantification. According to our participants, they relied upon quantification to track the performance of their own and their friends'. Because LoL is a team-based game, participants also monitored their teammates' performance data so as to increase their win chance. For example, they would ask their teammates to

Figure 1. Quantified Performance in LoL.

select characters[1] which they had satisfactory performance data with, and to avoid ones with poor data. In this way, LoL, quantification tools, and the player community constitute a networked culture of quantification. Governance here refers to all the social and technical means such as institutions, technologies, norms, and regulations, through which the subjects are governed (see [39]).

Quantification disciplines players, relying upon both technical means, as well as social surveillance to establish an ideal player with satisfactory performance data. As one participant said, "you are a bad player simply because your KDA[2] is bad." The culture of quantification thus sustains the discourse of performance that judges each player based on their publicized data.

Several other participants described how they used quantification tools to scrutinize and evaluate their in-game teammates even before their teamwork started. Participants told us they would attempt to persuade their teammates to adopt a certain playstyle after reading their quantified profiles, to increase chances of winning.

5.2.2 Self-Reflexivity. We found two general practices of care of the self. Participants embraced the utilities of quantification, and derived pride and meanings from quantification. Bardzell et al. found the power and governance in Second Life was productive in the enactment of care of the self in the sense that users made the informed and self-conscious decision to enter, discovered new feelings and experiences, and initiated progressive consideration that demands change on the self [5]. Our participants used quantification to trace their progression in LoL, and to analyze their performance to inform future play. As one participant said, "It helps me know my areas to improve... and climb [in] ranked [game mode]." As this player explained, he was not just the subject of quantification, being measured and assessed. He used language in positive terms to stress how quantification "helps" and how he could obtain knowledge of himself. In this way, he could improve, transform himself into a more skilled player. Climbing ranked, the common goal for many LoL players in this competitive game culture, was narrated as this player's goal, manifesting how the player's discovery of the self also includes active acquisition of the values of the game culture.

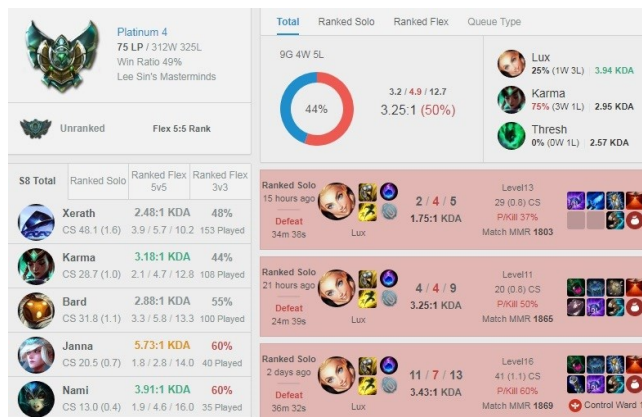However, participants grew wary about the prevalent use of quantification and the negative consequences it might

---

[1] Each in-game character has a different skill set and requires experiences and practices to play well.

[2] KDA is short for kill/death/assist ratio.

entail. Some participants expressed discomfort with being under involuntary monitoring. Their teammates verbally harassed them for trying out new characters or for poor performance in comparison to their previous match history. Other participants talked about the distress and anxiety associated with quantification. One participant said that "iI gives me anxiety knowing that my rank will drop." Anxiety could be viewed as the affective underside of power and discourse [78]. Quantification as a culture produced and reproduced power over players, some of whom in turn experienced a sense of powerlessness, and became acutely aware of their "problematic" relations with quantification, cognitively and emotionally.

Conscious, reflexive players recognized their own cognitive and emotional capacity in coping with quantification-related pressure, and negotiated their relations with quantification. For example, one participant told us that "I had issues with them…I became upset when a game hurt my kda… now I stay away from them to keep my sanity." A second participant mentioned that "I only use op.gg for promos." Op.gg is a popular quantification tool in the LoL community, and promo refers to promotion matches where winning the majority promotes player to a higher rank.

Participants had developed different strategies for using quantification, ranging from nonuse to selective use to frequent use. What was unanimous across all of them was their diligence in observing their selves under the influence of the cultural values and taking actions. Self-transformation in this context denotes individual endeavors in adjusting the perceived problematic relations with quantification, and to attain a better mode of being in terms of happiness and enjoyment of game.

5.2.3 Summary. To Foucault, power is neither positive nor negative, but dangerous [32]. Therefore, individuals must be concerned with and interrogate power, instead of merely being a passive subject. In the gaming culture of quantification, participants took care of themselves by cautiously adopting quantification and carefully examining their relations with quantification. Their constitution of the self encompassed both appropriation of a culture that privileges performance, rank, and competition, and cultivation of their individualistic way of using quantification.

5.3 The Neoliberal Healthcare System and Self-Learning

In this case, we look at systems that represent a totality of techniques, people, practices, and institutions. Healthcare systems in the U.S. are fragmented, lacking coordination

between resources and organizations [24]. Patients and caregivers must carry out many kinds of invisible work to ensure proper healthcare delivery [82,97]. This situation can be partially traced to s neoliberal paradigm in which individual patients are rational actors responsible for their own health conditions and healthcare [42,70]. Our analysis starts from an examination of the work that patients carried out and the knowledge they sought to obtain proper care.

5.3.1 The Neoliberal Healthcare System. Participants had to perform coordination work to connect poorly coordinated organizations, such as their employer, insurance company, pharmacy, and hospital. For example, they need to coordinate with their employer's human resources office, insurance company, and hospital to make sure their employee health benefits could over their newborn babies. They performed negotiation work with service providers to obtain affordable, high quality services. They performed complex informational work to identify a proper course of action in dealing with service providers when breakdowns happened, e.g., when bills were calculated wrong.

The healthcare system disciplined our participants into acting as obedient workers. Often the bill was a primary instrument of coercion. One participant said, "They [a medical group] were constantly sending us bills…the bills are very high. And the issue was I had to be the one constantly calling them, telling them that the insurance that they're billing is incorrect… for about fifteen months back and forth." In prison systems that Foucault studied [28], rules and constraints are visible and clear, disciplining people through instructions and punishments. In healthcare, coercion through billing was effected through a web of institutions such as debt collection and credit history services which ensured that patients and caregivers were forced to be responsible for errors and mistakes that originated from within the healthcare organizations.

Acts of coercion have a normalizing effect. One participant said that, "Everything relies on one's own effort to search, to understand…. I guess that's just how it works." By accepting their invisible work for the healthcare industry as normal, the participant was subjected to the neoliberal logic and its further developments that count on patients and caregivers to take upon more responsibility.

The healthcare system was an opaque and dysfunctional one where breakdowns frequently happened at different scales [45], with causes that were unknowable to participants. Our participants observed that breakdowns could result from errors of many kinds, miscommunication

across multiple departments of one organization or failed coordination across multiple organizations.

5.3.2 Self-Learning. Our participants faced tremendous difficulties in making sense of an opaque healthcare system with invisible rules and practices. Participants recognized that they must take initiative in fixing breakdowns, or they would be the ones to suffer. They thus sought to discover knowledge about the healthcare system. They would carefully ask questions of staff members regarding procedures and policies. Even with this knowledge, more was needed and had to be obtained through connections with a larger network of resources. For instance, our participants mentioned that they compared the websites of various healthcare providers' websites to learn whether their own provider had outdated information. They checked reviews of doctors and facilities on websites like Yelp. They consulted medical journals to check a doctor's diagnosis and medical suggestions. They gathered experiential knowledge from other parents on social media. For example, they learned that certain bills were negotiable if they told the healthcare providers they did not have health insurance or could not afford the co-pay.

Participants discussed the importance of self-reflection in learning. Whenever breakdown took place, they reflected upon what they already knew, and what else they needed to know so that such breakdowns would not happen again. For example, in the U.S., in-network means healthcare providers have contracts with insurance companies, and consumers can pay much less. Out-of-network means no contract and consumers have to pay the full amount out of their own pocket. It is common that a medical facility is in-network but that certain specialists, such as pathologists, are out-of-network. However, patients are not necessarily aware of this nuance, and because of this, a substantial portion of emergency room visits could lead to high bills [41]. Our participants learned about this knowledge from their own unexpected bills as well as others' experiences shared on social media. They knew they must be attentive to any service or interaction that they would have in medical facilities. One participant mentioned that when her doctor said she would need an ultrasound, she asked, "Is the radiologist in-network?"

5.3.3 Summary. In the neoliberal system of healthcare, parents and caregivers were embedded in a power arrangement that they could not escape and must manage so the system remained functional for them and their families. Although parents' primary concern was their children, rather than themselves, we argue that their actions are a form of care of the self. Care of the self entails care of others as a person recognizes their rightful social role in their family, community, and society, according to Foucault [32]. Taking actions on behalf of their children demonstrated participants' continuous work on renewing their knowledge of the healthcare system, or mastery over the self.

6 DISCUSSION

We used three cases to illustrate care of the self across the diverse contexts of a highly censored media environment, gaming culture, and healthcare. The central theme was that people individually carried out constant examinations of the self as well as their relations to their surroundings. Care of the self, as Foucault noted [32], reflects people's concern for the truth, or knowledge of the self. Participants' practices of the self reflected their acute awareness of the predicaments in a network of power relations and their will to self-transformation in order to obtain a better mode of being. Care of the self could appear primarily as proactive in the case of circumventing censorship, reflexive in the culture of quantification, or reactive, evident in the doings of patients and caregivers enmeshed in a complex healthcare system.

Building on prior discussion of the literature as well as the three case studies, we now move to close examination of human-technology relationship, and the implications of care of the self for HCI research and design.

6.1 Constitution of the Self through Negotiating with Technology

According to Ellul [23], digital technologies, institutions, and organizations are all forms of technique that represent gradually revised and refined systematic, rational, and efficient means of problem solving, very much in a modernist sense. In sustainable HCI, researchers have already reflected upon how the modernist orientation of persuasive technologies reduces design possibilities in terms of scoping problem too narrowly, focusing too much on individuals, assuming rationality, neglecting lived experience, and imposing short-term time frames [16]. Technology is not necessarily neutral nor does it always serve human well-being [68]. Our three cases demonstrated how people wrestled with technologies exactly because of technological developments centered on efficiency, systematicness, and rationality. In the case of censorship, technologies were used for maximizing efficiency at control, and participants needed to find workarounds. In the gaming case, a culture of prioritizing performance and play efficiency was developed, and participants had to

adjust their own engagements with the game. In healthcare, people encountered a "too-big-to-fail" neoliberal system [48,75] sophisticated at self-preservation and deflection of responsibilities onto individual patients and caregivers,.

What technology creates, in our three cases, is a form of existential crisis [68]. Participants were entangled with the technologies and it was legitimate for them to question the meaning of such entanglement: Why do I have to spend so much time just to bypass censorship? Why do I care so much about the numbers provided by quantification? Why do I have to do so much work just to take care of my children?

What is technology in relation to the self, then? Ulrich Beck said we are in late modernity now, which means all the old social institutions that create meaning, such as villages and the Church in traditional societies, no longer do so [9]. To create meaning, we are "condemned to individualization," taking responsibility, making choices, and responding to a rapidly shifting environment. Digital technologies displaced existing social structures with networks and flows. Our participants were indeed individualized into finding their own meanings through interactions with technologies. However, they were also compelled to generate meanings about their own selves with the presence of powerful entities—government, community, and system. These were all systems of governance that our participants were subjected to and transformed by. To some extent, as modern individuals, we are condemned to take care of ourselves, because no other external agents or structures can or will.

Technology does not just mediate power relations, it is itself a form of power that disciplines the self. Participants ascribed authority to technology, be it the reliance on technological paths to circumvent censorship or trust in quantification to assess the self. Max Weber considered that authority legitimatized power without either coercion or threat of violence [99]. When technology assumed authority from participants, they were subjected to and changed by the authority. Therefore, wary participants engaged in constant negotiation with technology, what we considered practices of self.

The starting point of practices of self was participants' concern for truth. They first became critical and reflective on the problematics of the status quo structure. Then they could carry out various actions on rediscovering knowledge about their own selves and their surroundings. Their actions varied along several dimensions. First, they could initiate diverse ways and degrees of use and "non-use" [8].

For example, in the censorship case, participants stressed that they prioritized their interest and time, and would not try to do comprehensive information search for any single political topic. In the quantification case, participants wanted to sustain their wellbeing and the actual purpose of playing games, and thus chose to use quantification tools selectively. Second, they could learn strengths and weakness of each technology, and skillfully stitch them together for a single purpose [57]. In this way, they did not need to rely upon the design of any single technology. Third, care of the self entails care of others in the sense of a person would identify their proper relations with other people. Care for others could be manifested as sharing sensitive information with other people in the censorship case, or taking care of their children in the healthcare case.

6.2 Turn to the Self in HCI

Mainstream HCI has prioritized technical transformation, i.e., novel technologies, and social transformation, i.e., how to effect positive social changes. Ideas driving these transformations mostly operate at the structural level, focusing intensively on the environment external to the self, while paying little attention to self-transformation. We emphasize that any technology, even if designed with sound intentions and a noble agenda, is itself a source of disciplinary power. Therefore, discussions of structural transformations need to involve considerations of self-transformation, and vice versa.

Care of the self must precede care of others (i.e., other people or technologies) in the sense that a person must be mindful of their own knowledge, strengths and limits, and engage in a constant reexamination of the self, before they can productively contribute to acts of care of others in terms of initiating structural changes. HCI already has a few topical areas focused on the self, such as self-enhancement [18,102] and self-tracking [64]. But it would be deterministic to assume that designed technology would certainly empower self. Our study of quantification [55] shows that tools intended to measure player performance could discipline players, and in some cases, do harm. The focus on self should not be limited to topical areas such as self-tracking and health. A self dimension exists in most, if not all, HCI projects. For any technology under examination, researchers can always ask how the technology plays a role in people's view of and work on the self.

Foucault foregrounded the importance of practice in constructing the self by noting that when he talked about care of the self, it's always practices of the self [32].

Therefore, to study the self is to study practices of the self. This is similar to Kuutti and Bannon's call for the turn to practice in HCI, locating the origin of the social in practices [61]. In practical terms, we should examine what practices people perform to cultivate selves to achieve self-transformation. However, we also share Kaptelinin's concern that detailed empirical studies of situated, real-life processes can be insufficient in discovering very personal choices and experiences such as the meaning of one's life [52]. This is especially true when people exercise individualistic practices of care of the self and thus constantly ask existential questions about the meanings of their actions and technological engagements. While Kuutti and Bannon stressed that "practices are a shared resource among a community of people" [61], what we are concerned with is the individualistic aspect of practices of the self that pertain to different individuals' internal properties such as capacity, mentality, and reflexivity. In certain ways, a few HCI research methods such as interviews allow the opportunity to engage in dialogues with participants, where "contemplation of self and care of self are related dialectically" [33]. The goal is not necessarily to discover a true, static state of participants, but to work together, reflexively and introspectively, to explore critical aspects about the self and meaning-making, such as existential questions like "who am I?" and critical questions such as "do you take care of yourself?"

6.3 Why Foucault and His Care of the Self?

Bardzell encouraged researchers to reflect upon why HCI would benefit from a particular theory they propose [3]. We could provide several points to justify the relevance of the notion of care of the self to HCI. Foucault has been influential for his writings on power relation and structures that discipline people, which have already taken root in the HCI literature [51,83]. Foucault's analysis of power is always linked to his central concern on the self [32,33]. This rationale resonates with the concern we expressed at the beginning of the paper about how the increasingly powerful technology alters the dynamics between self and networks of power relations.

Foucault was concerned with how in the modern world, knowledge of oneself, or "know yourself," obscures "take care of yourself" [33]. To him, "take care of yourself" starts with concern for the self, which, in our three cases, meant participants' awareness of the power that permeates technology. This awareness was the starting point they sought to discover knowledge and negotiate and renegotiate relations with technology. Only paying attention to knowledge of the self would be insufficient to

articulate, for example, how mainland citizens decided to forgo knowledge of some events that they had no time or interest to follow up on, how LoL players tried to distance themselves from quantification that supplied them knowledge, or how patient and caregivers refused to accept consequences incurred by breakdowns.

6.4 Design Implications

Drawing from notions of power relations and care of the self, we could consider design as fundamentally an act of establishing a source of power. Therefore, pluralism in design is vital in a design space where only one technology is available. When multiple technologies coexist and compete, people do not have to rely on only one. Technology as a source of power is not inherently positive or negative, but epistemically dangerous. Fundamentally, it structurally alters the external environment of the self, and thus should not go unnoticed or be taken for granted. In this regard, a few design approaches are fruitful in inspiring reflections, such as critical design [4] and speculative design [2]. These approaches seek to invite thoughts and incur mental effort from people, which might be valuable to the rise of concern for the self.

We call for more attention to self-transformation even when the primary design goals are social or technical transformations. It would be valuable for designers to critically engage with their own work, asking how the technology intersects with self-realization and self-transformation. Engagement, a popular value celebrated in many HCI design efforts, could be hugely problematic. For example, clickbait and polarized and extremified recommendation content on social media are designed to engage people [96]. Dark patterns in user experience design use knowledge about human behavior to manipulate user actions [43]. Light et al. criticized *bovine design* that encouraged passivity and rote behavior [68]. These design patterns could all be successful at engaging users in terms of longer visit time, more purchase actions, and more user-generated data, and structurally alter external environment in ways beyond individuals' capacity to observe.

7 CONCLUSION

We discussed Foucault's notion of care of the self in relation to human-computer interaction through three cases of people negotiating and renegotiating with technology. This notion is particularly relevant and provoking to technology researchers concerned with transformation of the external environments, but inattentive to self-transformation. Self could be arguably

more difficult to recognize or measure, compared to external factors. Our three cases have begun to show that the self always takes steps, even if they are small and halting, to be unruly and free. Further research is needed to contemplate ways of putting self and structural transformations into an equilibrium.

REFERENCES

[1] Anders Albrechtslund and Lynsey Dubbeld. 2005. The Plays and Arts of Surveillance: Studying Surveillance as Entertainment. *Surveillance & Society* 3, 2/3: 216–221.

[2] James Auger. 2013. Speculative design: crafting the speculation. *Digital Creativity* 24, 1: 11–35. http://doi.org/10.1080/14626268.2013.767276

[3] Jeffrey Bardzell. 2016. A Dark Pattern in Humanistic HCI. *INTERACTIONS.*

[4] Jeffrey Bardzell and Shaowen Bardzell. 2013. What is "critical" about critical design? *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI '13*, ACM Press, 3297–3306. http://doi.org/10.1145/2470654.2466451

[5] Jeffrey Bardzell, Shaowen Bardzell, Guo Zhang, and Tyler Pace. 2014. The lonely raccoon at the ball: designing for intimacy, sociability, and selfhood. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 3943–3952. http://doi.org/10.1145/2556288.2557127

[6] Shaowen Bardzell. 2010. Feminist HCI: taking stock and outlining an agenda for design. *Proceedings of the 28th international conference on Human factors in computing systems - CHI '10*, ACM Press, 1301–1310. http://doi.org/10.1145/1753326.1753521

[7] Shaowen Bardzell and Jeffrey Bardzell. 2011. Towards a feminist HCI methodology: social science, feminism, and HCI. *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*, ACM Press, 675–684. http://doi.org/10.1145/1978942.1979041

[8] Eric P.S. Baumer, Phil Adams, Vera D. Khovanskaya, et al. 2013. Limiting, leaving, and (re) lapsing: an exploration of facebook non-use practices and experiences. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI '13*, ACM Press, 3257–3266. http://doi.org/10.1145/2470654.2466446

[9] Ulrich Beck. 1992. *Risk society: towards a new modernity.* Sage Publications.

[10] Mark Bevir. 1999. Foucault and Critique: Deploying agency against autonomy. *Political Theory* 27, 1: 65–84. http://doi.org/10.1177/0090591799027001004

[11] Timothy W. Bickmore, Laura M. Pfeifer, and Brian W. Jack. 2009. Taking the time to care: empowering low health literacy hospital patients with virtual nurse agents. *Proceedings of the 27th international conference on Human factors in computing systems - CHI 09*, ACM Press, 1265–1274. http://doi.org/10.1145/1518701.1518891

[12] Geoffrey C. Bowker and Susan Leigh Star. 2000. *Sorting Things Out: Classification and Its Consequences.* MIT Press.

[13] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2: 77–101. http://doi.org/10.1191/1478088706qp063oa

[14] Philip Brey. 2008. The Technological Construction of Social Power. *Social Epistemology* 22, 1: 71–95. http://doi.org/10.1080/02691720701773551

[15] Deana Brown, Victoria Ayo, and Rebecca E. Grinter. 2014. Reflection through design: immigrant women's self-reflection on managing health and wellness. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 1605–1614. http://doi.org/10.1145/2556288.2557119

[16] Hronn Brynjarsdottir, Maria Håkansson, James Pierce, Eric Baumer, Carl DiSalvo, and Phoebe Sengers. 2012. Sustainably unpersuaded: how persuasion narrows our vision of sustainability. *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12*, ACM Press, 947–956. http://doi.org/10.1145/2207676.2208539

[17] Lawrence Buell. 1999. Introduction: In Pursuit of Ethics. *Papers on Language and Literature* 114, 1: 7–19.

[18] Stefan Parry Carmien and Gerhard Fischer. 2008. Design, adoption, and assessment of a socio-technical environment supporting independence for persons with cognitive disabilities. *Proceeding of the twenty-sixth annual CHI conference on Human factors in computing systems - CHI '08*, ACM Press, 597–606. http://doi.org/10.1145/1357054.1357151

[19] Steven Crowell. 2004. Existentialism. *Stanford Encyclopedia of Philosophy.* Retrieved September 17, 2018 from https://plato.stanford.edu/entries/existentialism/

[20] Andrew Dilts. 2011. From 'Entrepreneur of the Self' to 'Care of the Self': Neo-liberal Governmentality and Foucault's Ethics. *Foucault Studies* 0, 12: 130. http://doi.org/10.22439/fs.v0i12.3338

[21] Lynn Dombrowski, Ellie Harmon, and Sarah Fox. 2016. Social Justice-Oriented Interaction Design. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems - DIS '16*, ACM Press, 656–671. http://doi.org/10.1145/2901790.2901861

[22] Hamid Ekbia and Bonnie Nardi. 2016. Social Inequality and HCI: The View from Political Economy. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 4997–5002. http://doi.org/10.1145/2858036.2858343

[23] Jacques Ellul. 1964. *The Technological Society.* Vintage Books.

[24] Alain C. Enthoven. 2009. Integrated Delivery Systems: The Cure for Fragmentation. *American Journal of Managed Care* 15, 12.

[25] Tom Feltwell, Shaun Lawson, Enrique Encinas, et al. 2018. "Grand Visions" for Post-Capitalist Human-Computer Interaction. *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–8. http://doi.org/10.1145/3170427.3170609

[26] Casey Fiesler and Blake Hallinan. 2018. "We Are the Product": Public Reactions to Online Data Sharing and Privacy Controversies in the Media. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–13. http://doi.org/10.1145/3173574.3173627

[27] Thomas R. Flynn. 2009. *Existentialism.* Sterling.

[28] Michel Foucault. 1977. Discipline and Punish: The Birth of the Prison. Vintage Books.

[29] Michel Foucault. 1980. Truth and Power. In *Power/Knowledge: Selected Interviews & Other Writings 1972-1977*, Colin Gordon (ed.). The Harvester Press.

[30] Michel Foucault. 1988. The History of Sexuality, Vol. 3: The Care of the Self. Vintage.

[31] Michel Foucault. 1990. The History of Sexuality, Vol. 2: The Use of Pleasure. Vintage Books.

[32] Michel Foucault. 1998. The Ethics of the Concern for Self as a Practice of Freedom. In *Ethics: Subjectivity and Truth (Essential Works of Foucault, 1954-1984, Vol. 1)*, Paul Rabinow (ed.). The New Press, New York, 281–302.

[33] Michel Foucault. 1998. Technologies of the self. In *Ethics: Subjectivity and Truth (Essential Works of Foucault, 1954-1984, Vol. 1)*, Paul Rabinow (ed.). The New Press, New York, 223–252.

[34] Michel Foucault. 1998. Subjectivity and Truth. In *Ethics: Subjectivity and Truth (Essential Works of Foucault, 1954-1984, Vol. 1)*, Paul Rabinow (ed.). The New Press, New York, 87–92.

[35] Michel Foucault. 2001. Madness and Civilization: A History of Insanity in the Age of Reason. Psychology Press.

[36] Michel Foucault. 2003. The Birth of the Clinic: An Archaeology of Medical Perception. Psychology Press.

[37] Michel Foucault. 2003. Society must be defended: lectures at the Collège de France, 1975-76. Picador.

[38] Michel Foucault. 2008. *The birth of biopolitics: lectures at the Collège de France, 1978-79.* Palgrave Macmillan.

[39] Michel Foucault. 2009. Security, territory, population: lectures at the Collège de France, 1977-78. Palgrave Macmillan.

[40] Christian Fuchs. 2012. The Political Economy of Privacy on Facebook. *Television & New Media* 13, 2: 139–159. http://doi.org/10.1177/1527476411415699

[41] Christopher Garmon and Benjamin Chartock. 2017. One In Five Inpatient Emergency Department Cases May Lead To Surprise Bills. *Health Affairs* 36, 1: 177–181. http://doi.org/10.1377/hlthaff.2016.0970

[42] Stinne Glasdam, Christine Oeye, and Lars Thrysoee. 2015. Patients' participation in decision-making in the medical field - 'projectification' of patients in a neoliberal framed healthcare system. *Nursing Philosophy* 16, 4: 226–238. http://doi.org/10.1111/nup.12092

[43] Colin M. Gray, Yubo Kou, Bryan Battles, Joseph Hoggatt, and Austin L. Toombs. 2018. The Dark (Patterns) Side of UX Design. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–14. http://doi.org/10.1145/3173574.3174108

[44] Xinning Gui, Yu Chen, Clara Caldeira, Dan Xiao, and Yunan Chen. 2017. When Fitness Meets Social Networks: Investigating Fitness Tracking and Social Practices on WeRun. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, ACM Press, 1647–1659. http://doi.org/10.1145/3025453.3025654

[45] Xinning Gui and Yunan Chen. 2019. Making Healthcare Infrastructure Work: Unpacking the Infrastructuring Work of Individuals. *CHI'2019*.

[46] Xinning Gui, Yunan Chen, and Kathleen H. Pine. 2018. Navigating the Healthcare Service "Black Box": Individual Competence and Fragmented System. *Proceedings of the ACM on Human-Computer Interaction (CSCW 2018 second cycle)* 2, CSCW: Article 61.

[47] Gary Gutting and Johanna Oksala. 2018. Michel Foucault. *The Stanford Encyclopedia of Philosophy (Summer 2018 Edition)*. Retrieved from https://plato.stanford.edu/archives/sum2018/entries/foucault/

[48] Daniel M Hartung, Dennis N Bourdette, Sharia M Ahmed, and Ruth H Whitham. 2015. The cost of multiple sclerosis drugs in the US and the pharmaceutical industry: Too big to fail? *Neurology* 84, 21: 2185–92. http://doi.org/10.1212/WNL.0000000000001608

[49] AB Hofmeyr. 2015. The Ethics and Politics of Self-Creation in Foucault. In *The Ethics of Subjectivity*. Palgrave Macmillan UK, London, 126–143. http://doi.org/10.1057/9781137472427_8

[50] Human Rights Watch. 2013. China: Nationwide Arrests of Activists, Critics Multiply. *Human Rights Watch*. Retrieved from http://www.hrw.org/news/2013/08/30/china-nationwide-arrests-activists-critics-multiply

[51] Lilly C. Irani and M. Six Silberman. 2013. Turkopticon: Interrupting Worker Invisibility in Amazon Mechanical Turk. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, ACM, 611–620. http://doi.org/10.1145/2470654.2470742

[52] Victor Kaptelinin. 2016. Making the Case for an Existential Perspective in HCI Research on Mortality and Death. *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '16*, ACM Press, 352–364. http://doi.org/10.1145/2851581.2892585

[53] Victor Kaptelinin. 2018. Technology and the Givens of Existence: Toward an Existential Inquiry Framework in HCI Research. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–14. http://doi.org/10.1145/3173574.3173844

[54] Yubo Kou and Colin M. Gray. 2018. "What do you recommend a complete beginner like me to practice?": Professional Self-Disclosure in an Online Community. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW. http://doi.org/10.1145/3274363

[55] Yubo Kou and Xinning Gui. 2018. Entangled with Numbers: Quantified Self and Others in a Team-Based Online Game. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW: 1–25. http://doi.org/10.1145/3274362

[56] Yubo Kou, Xinning Gui, and Yong Ming Kow. 2016. Ranking Practices and Distinction in League of Legends. *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play - CHI PLAY '16*, ACM Press, 4–9. http://doi.org/10.1145/2967934.2968078

[57] Yubo Kou and Bonnie Nardi. 2018. Complex Mediation in the Formation of Political Opinions. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18.* http://doi.org/10.1145/3173574.3174210

[58] Yubo Kou, Bryan Semaan, and Bonnie Nardi. 2017. A Confucian Look at Internet Censorship in China. *Human-Computer Interaction - INTERACT 2017.* http://doi.org/10.1007/978-3-319-67744-6_25

[59] Yong Ming Kow. 2018. Digital Introspection Within Learning-on-my-Own Rhetoric Among Computer Gamers. *Mind, Culture, and Activity* 25, 1: 40–52. http://doi.org/10.1080/10749039.2017.1329319

[60] Juhi Kulshrestha, Motahhare Eslami, Johnnatan Messias, et al. 2017. Quantifying Search Bias: Investigating Sources of Bias for Political Searches in Social Media. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing - CSCW '17*, ACM Press, 417–432. http://doi.org/10.1145/2998181.2998321

[61] Kari Kuutti and Liam J. Bannon. 2014. The turn to practice in HCI: towards a research agenda. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 3543–3552. http://doi.org/10.1145/2556288.2557111

[62] Airi Lampinen, Vilma Lehtinen, Asko Lehmuskallio, and Sakari Tamminen. 2011. We're in it together: interpersonal management of disclosure in social network services. *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*, ACM Press, 3217–3226. http://doi.org/10.1145/1978942.1979420

[63] Thomas Lemke. 2001. "The birth of bio-politics": Michel Foucault's lecture at the Collège de France on neo-liberal governmentality. *Economy and Society* 30, 2: 190–207. http://doi.org/10.1080/03085140120042271

[64] Ian Li, Anind Dey, and Jodi Forlizzi. 2010. A stage-based model of personal informatics systems. *Proceedings of the 28th international conference on Human factors in computing systems - CHI '10*, ACM Press, 557–566. http://doi.org/10.1145/1753326.1753409

[65] Bin Liang and Hong Lu. 2010. Internet Development, Censorship, and Cyber Crimes in China. *Journal of Contemporary Criminal Justice* 26, 1: 103–120.

[66] Ann Light. 2008. Empirical vernacular philosophy, or towards an existential HCI. *HCI 2008: British HCI Conference: Workshop on Critical Issues in Interaction Design.* Retrieved from https://sites.google.com/site/designcriticism/positi%0Aonstatements

[67] Ann Light. 2016. Commentary For alt.chi paper Making the Case for an Existential Perspective in HCI Research on Mortality and Death by Victor Kaptelinin.

[68] Ann Light, Alison Powell, and Irina Shklovski. 2017. Design for Existential Crisis in the Anthropocene Age. *Proceedings of the 8th International Conference on Communities and Technologies - C&T '17*, ACM Press, 270–279. http://doi.org/10.1145/3083671.3083688

[69] Ann Light, Irina Shklovski, and Alison Powell. 2017. Design for Existential Crisis. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '17*, ACM Press, 722–734. http://doi.org/10.1145/3027063.3052760

[70] Deborah Lupton. 2014. Self-tracking cultures: towards a sociology of personal informatics. *Proceedings of the 26th Australian Computer-Human Interaction Conference on Designing Futures the Future of Design - OzCHI '14*, ACM Press, 77–86. http://doi.org/10.1145/2686612.2686623

[71] Rebecca MacKinnon. 2007. Flatter world and thicker walls? Blogs, censorship and civic discourse in China. *Public Choice* 134, 1–2: 31–46. http://doi.org/10.1007/s11127-007-9199-0

[72] Rebecca MacKinnon. 2011. China's "Networked Authoritarianism." *Journal of Democracy 22*, 32–46. http://doi.org/10.1353/jod.2011.0033

[73] Adrienne Massanari. 2017. #Gamergate and The Fappening: How Reddit's algorithm, governance, and culture support toxic technocultures. *New Media & Society* 19, 3: 329–346. http://doi.org/10.1177/1461444815608807

[74] Jacob Metcalf, Emily F. Keller, and Danah Boyd. 2016. Perspectives on Big Data, Ethics, and Society. *The Council for Big Data, Ethics and Society.*

[75] R. Minhas, C. Wendt, and A. Wierzibicki. 2008. Is healthcare in the United States too big to fail? *International Journal of Clinical Practice* 62, 12: 1827–1830. http://doi.org/10.1111/j.1742-1241.2008.01949.x

[76] Torin Monahan. 2016. Built to lie: Investigating technologies of deception, surveillance, and control. *The Information Society* 32, 4: 229–240. http://doi.org/10.1080/01972243.2016.1177765

[77] Michael J. Muller and Sarah Kuhn. 1993. Participatory design. *Communications of the ACM* 36, 6: 24–28. http://doi.org/10.1145/153571.255960

[78] Justine S. Murison. 2011. The Politics of Anxiety in Nineteenth-Century American Literature. Cambridge University Press.

[79] Safiya Umoja Noble. Algorithms of oppression: how search engines reinforce racism. NYU Press.

[80] Francisco Nunes and Geraldine Fitzpatrick. 2018. Understanding the Mundane Nature of Self-care: Ethnographic Accounts of People Living with Parkinson's. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–15. http://doi.org/10.1145/3173574.3173976

[81] Wanda J. Orlikowski. 2000. Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science* 11, 4: 404–428. http://doi.org/10.1287/orsc.11.4.404.14600

[82] Nelly Oudshoorn. 2008. Diagnosis at a distance: the invisible work of patients and healthcare professionals in cardiac telemonitoring technology. *Sociology of Health & Illness* 30, 2: 272–288. http://doi.org/10.1111/j.1467-9566.2007.01032.x

[83] Leysia Palen and Paul Dourish. 2003. Unpacking "privacy" for a networked world. ACM, 129–136. http://doi.org/10.1145/642611.642635

[84] Matt Porter. 2016. League of Legends Surpasses 100 Million Monthly Active Players. *ign.com.* Retrieved from http://www.ign.com/articles/2016/09/14/league-of-legends-surpasses-100-million-monthly-active-players

[85] Stephen Purpura, Victoria Schwanda, Kaiton Williams, William Stubler, and Phoebe Sengers. 2011. Fit4life: the design of a persuasive technology promoting healthy behavior and ideal weight. *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*, ACM Press, 423–432. http://doi.org/10.1145/1978942.1979003

[86] Adrian Rauchfleisch and Mike S. Schäfer. 2014. Multiple public spheres of Weibo: a typology of forms and potentials of online public spheres in China. *Information, Communication & Society*: 1–17. http://doi.org/10.1080/1369118X.2014.940364

[87] Jennifer A. Rode. 2011. Reflexivity in digital anthropology. *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*, ACM Press, 123–132. http://doi.org/10.1145/1978942.1978961

[88] Hanna Schneider, Malin Eiband, Daniel Ullrich, and Andreas Butz. 2018. Empowerment in HCI - A Survey and Framework. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, ACM Press, 1–14. http://doi.org/10.1145/3173574.3173818

[89] Nick Srnicek. 2016. *Platform capitalism.* John Wiley & Sons.

[90] Susan Leigh Star. 1999. The Ethnography of Infrastructure. *American Behavioral Scientist* 43, 3: 377–391. http://doi.org/10.1177/00027649921955326

[91] Susan Leigh Star and Karen Ruhleder. 1996. Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research* 7, 1: 111–134. http://doi.org/10.1287/isre.7.1.111

[92] Kate Starbird, Ahmer Arif, Tom Wilson, Katherine Van Koevering, Katya Yefimova, and Daniel Scarnecchia. 2018. Ecosystem or Echo-System? Exploring Content Sharing across Alternative Media Domains. *ICWSM.*

[93] Kate Starbird, Emma Spiro, Isabelle Edwards, Kaitlyn Zhou, Jim Maddock, and Sindhuja Narasimhan. 2016. Could This Be True?: I Think So! Expressed Uncertainty in Online Rumoring. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 360–371. http://doi.org/10.1145/2858036.2858551

[94] Tiziana Terranova. 2000. Free Labor: Producing Culture for the Digital Economy. *Social Text, 63* 18, 2: 33–58.

[95] Zeynep Tufekci. 2013. Big Data: Pitfalls, Methods and Concepts for an Emergent Field. *SSRN Electronic Journal.* http://doi.org/10.2139/ssrn.2229952

[96] Zeynep Tufekci. 2018. YouTube, the Great Radicalizer. *The New York Times.* Retrieved from https://www.nytimes.com/2018/03/10/opinion/sunday/youtube-politics-radical.html?rref=collection%2Fcolumn%2Fzeynep-tufekci&action=click&contentCollection=opinion&region=stream&module=stream_unit&version=latest&contentPlacement=6&pgtype=collection

[97] Kenton T. Unruh and Wanda Pratt. 2008. The Invisible Work of Being a Patient and Implications for Health Care: "[the doctor is] my business partner in the most important business in my life, staying alive." *Ethnographic Praxis in Industry Conference Proceedings* 2008, 1: 40–50. http://doi.org/10.1111/j.1559-8918.2008.tb00093.x

[98] Jessica Vitak and Jinyoung Kim. 2014. "You can't block people offline": examining how facebook's affordances shape the

disclosure process. *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing - CSCW '14*, ACM Press, 461–474. http://doi.org/10.1145/2531602.2531672

[99] Max Weber. 1978. Economy and society: an outline of interpretive sociology. University of California Press.

[100] Langdon Winner. 1980. Do Artifacts Have Politics? *Modern Technology: Problem or Opportunity* 109, 1: 121–136.

[101] Robert K. Yin. 2009. *Case study research: design and methods.* SAGE Publications.

[102] John Zimmerman. 2009. Designing for the self: making products that help people become the person they desire to be. *Proceedings of the 27th international conference on Human factors in computing systems - CHI 09*, ACM Press, 395–404. http://doi.org/10.1145/1518701.1518765