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Simondon on Datafication

A Techno-Cultural Method

Mark Coté, Jennifer Pybus

Abstract

This article proposes the techno-cultural workshop as an innovative method for opening up the materiality of computational media and data flows in order to increase understanding of the socio-cultural and political-economic dimensions of datafication. Building upon the critical, creative hacker ethos of technological engagement, and the collective practice of the hackathon, the techno-cultural workshops is directed at humanities researchers and social and cultural theorists. We conceptually frame this method via Simondon as a practice-led opportunity to rethink the contested relationship between the human, nature and technology, with a view to challenging social and cultural theory that ignores the human reality of the technical object. We outline an exemplar techno-cultural workshop which explored mobile apps as i) an opportunity to use new digital tools for empirical research, and ii) as technical objects and elements for better understanding their social and cultural dimensions. We see political efficacy in the techno-cultural method not only in augmenting critical and creative agency, but as a practical exploration of the concept of data technicity, an inexhaustible relationality that exceeds the normative and regulatory utility of the data we generate and can be linked anew into collective capacities to act.

Keywords: Datafication; hacker; digital materiality; data technicity.

Introduction

Hackathons have been riding the wave of the data deluge, growing from a niche event for programmers and software developers to an established techno-cultural phenomenon with foci ranging from social justice issues to corporate profit. Related but not limited to the hackathon is the subject of the hacker, defined by the 1993 Internet Users' Glossary as a person that "delights in having an intimate understanding of the internal workings of a system, computers and computer networks in particular" (Malkin and Parker 1993: 21). This paper draws on both the practice of the hackathon and subject of the hacker to ask after the data deluge, what? That

is, now that processes of datafication (Cukier/Mayer-Schonberger 2013; Pybus et al. 2015) have suffused everyday life, transforming how we understand ourselves and the world around us, and increasingly articulating our conditions of possibility in ever-more real time, what can we do to gain data agency? Here we pose a political question: can the interlocking practice and subject of hacking exceed their traditional parameters to strategically counter the tendency toward control and value extraction, which increasingly dominates processes of datafication?

Through a series of externally-funded research projects, we have engaged with hackers and in hackathons. Such experiences have evinced an emerging methodology for critical and active engagement in our material conditions of datafication. By collaborating with coders or programmers, we have been able to draw on their preexisting understanding of the technical processes of datafication. This fulcrum point has enabled us to propose a more heterogeneous, interdisciplinary subject and practice. We therefore, put forward not the hackathon but the interdisciplinary workshop as a *techno-cultural method*. For us, this functions as a zone of translation, a space manifested through different levels in participant skill sets, areas of expertise, and technical capacities. This admixture of participants, some more adept at theorising and others more so at engaging with the material conditions that support and expand the capture of data, enables a new technologically mediated method. Specifically, one that demonstrates how theoretical understanding emerges through and from practical engagement.

We will detail one such workshop that was led by an academic coder-researcher and a prominent white-hat hacker,¹ and attended primarily by arts and humanities students without advanced computer skills. The aim of this techno-cultural workshop was to open up applications in an Android environment and reveal how permissions are written into code, in turn facilitating the myriad and intensive flows of data through to third parties and data brokers. This heterogeneous interdisciplinarity cultivated different pedagogical practices and hence new digital literacies for our participants. In this instance, people shared or developed skill sets for decompiling – or reverse engineering – mobile apps. This technical examination of application source code revealed the permissions written into the software that regularly captures our data. For other participants, the workshop was a collective opportunity for exploring the mode of existence of the very technical objects which enable the processes of datafication. In other words, the processes that transform and produce new forms of value within the mobile ecosystem. We thus propose the interdisciplinary workshops as an emergent *techno-cultural* political space to open other possibilities for critical engagement, by facilitating new practices for understanding those digital objects that enable the capture of our social data so that it can be transformed into multiple sites of surplus value.

1 The term ‘white hat’ is often used to denote a security expert who has been paid to discover various vulnerabilities that may be present with an organisation’s software (Zetter 2016).

We are positioning our interdisciplinary workshops under the theoretical paradigm of the philosopher of technology Gilbert Simondon (Bardin 2016; Barthélemy 2015; Combes 2013; MacKenzie 2012; Simondon 1958). His basic article of faith was that the relationship between technology and culture was confused and conflictual, and indeed, one wherein the latter acted as a defensive bulwark against the former, and thus precluded an informed engagement with the human-technical milieu in which we live. We call this a techno-cultural method because, as Simondon noted in the opening paragraphs of his major work, *Du mode d'existence des objets techniques* (1958), there is human reality in technical reality for which the cultural must reckon in knowledge and values. In other words, modes of existence are human and technical in ways that are always already mutually constitutive.²

So in addition to developing tools and skills for data practice, we see possibilities in the workshop as a techno-cultural antidote which can recalibrate theoretical engagement with the social, cultural, political and economic dimensions of big data. We posit that 'handling' the technical objects of datafication allow participants to gain a more practical appreciation of how technology resists reduction to discourse and signification because it always already conditions them (Mackenzie 2002: 5). As such, the techno-cultural method exceeds the discursive critiques of cultural theory. Here one might ask how a more direct engagement in technical objects effectively grounds the theorising of techno-cultural relations? The Simondonian inflection on the interdisciplinary workshop makes visible the specific *modes of existence* rooted in the flow of data that we continuously generate. We see political stakes in this critical elaboration of technical culture. Indeed, this opening up or unpacking the technical objects of datafication continues critical inquiry into the 'black box' (Latour 1999), that is, making more visible complex technical systems. What is new is the Simondonian perspective: exposed are technical elements, held together by the dynamic of technicity which coheres disparate realities into technical objects. Significantly, it is also this technicity which articulates the possibilities of collective life. By critically exploring datafication through the technical object of the mobile ecosystem, the interdisciplinary workshop offers a fresh understanding of how it mediates relations between both humans and the environment but also between individuals and collectives.

We present the interdisciplinary workshop as an emergent methodology most appropriate to our era of ubiquitous datafication. Amidst processes which quantify, calculate, qualify, classify, categorise and otherwise produce knowledge about ourselves and the world around us in an increasingly real-time and pre-cognitive manner, we see possibilities for a different methodology, capable of providing ways of engaging in the digital ecosystems that make up our everyday lives. By foregrounding our human and technical modes of existence in their complex

2 "Nous voudrions montrer que la culture ignore dans la réalité technique une réalité humaine, et que, pour jouer son rôle complet, la culture doit incorporer les êtres techniques sous forme de connaissance et de sens des valeurs." (Simondon 1958: 9)

unfolding relations, we question whether we can more rigorously understand how the human, in its social, cultural political and economic dimensions is only ever mediated by and exteriorised through technical objects. We do so by first concisely outlining the hacker and hackathons, a subjectivity and practice we both draw upon and break from. What of their situated specificity can be diffused into an open and generalised critical and creative interdisciplinary environment to match the challenges of pervasive and proprietary datafication? We will then outline an exemplar interdisciplinary workshop that we held which explored the mobile ecosystem. Finally, we pass this approach through the Simondonian prism to see if we can effectively present a social pedagogy of technics.

Hacker and Hackathons

The techno-cultural workshop draws from both the hacker and hackathons, even though we lay claim to representing neither in our proposed method. Instead, we are situating our proposal of the techno-cultural workshop in relation to the diverse ways that different hacker communities aspire to engage and transform technologies as political practices. These might include the creation and circulation of free software (Kelty 2008; Coleman 2012), the cultivation of myriad forms of participatory and tinkerer cultures (Wark 2005; Ratto/Boyer 2014) as well as a political commitments to openness and interoperability (Baack 2015; Powell 2012), that is, to making accessible what otherwise might remain opaque to the everyday user. We agree with Kelty that “coding, hacking, patching, sharing, compiling, and modifying of software are forms of political action” (2008: 8). Where we differ, however, is in imagining these capacities as becoming diffused beyond the geek by turning the workshop into both an intermediary and a site of collaboration and learning between hackers and non-hackers. Such emerging collectives can cultivate more widespread understanding of our “unruly technical materiality” (2008: 8) that infuses our own data making practices. Our contention is that the workshop can unpack not only the material objects that seek to capture our own socio-cultural practices when we use applications but how that mode of technical existence engenders – that is, enables and constrains – subsequent modes of human existence. This is why we are drawn to practices that drive the social imaginaries of geeks, as there we see tools that can prise open an array of black boxes through which we collectively live.

The hackathon holds interest as a spatio-temporally defined event, an assemblage with broad methodological possibilities. For example, we have used them to create different tools to facilitate a more data literate subject,³ or, as outlined here, to break open the proprietarily guarded and siloed ecosystems of our various

3 For a more detailed account, please see our previous article ‘Hacking the Social Life of Big Data’ (Pybus/Coté/Blanke 2015).

platforms and devices. Traditionally, these events are structured on an established trajectory, as outlined by Lodato and DiSalvo (2016). First, the participants are presented with a series of challenges from which they will have to choose; next they will organise themselves into teams, ideally possessing an array of technical capacities – including both front and backend skills; and, finally, often after two days (and lots of pizza),⁴ participants will present the digital objects that they have created to the larger group. These punctuated moments of creative productivity generate forms of value that are both contested and difficult to measure. On the one hand, the events yield prototypes and tools as a result of group creation. We are in agreement with Lodato and DiSalvo however, that the value of the hackathon cannot be distilled down to what was produced but instead to the mode of material participation itself (2016). Indeed, it is the structure of the event that draws various human and material elements together wherein we see critical and creative possibilities. In other words, we see a potential in the process and means by which participation is enacted which is more important than the outcome. Others, such as Gregg (2015), frame these events as exploitative sites of immaterial or ‘free’ labor, focusing on the productive outcomes, as opposed to the process. As an Intel-based researcher, she limits her focus to corporate hackathons, which the high-tech industry use as an important site of capture, drawing on employee goodwill and general intellect, and in the process augmenting their productivity while extracting surplus value. Gregg, however, dismisses any political possibility within the hackathon as a “momentary exercises in speculative citizenship” (2015: 195) that only bring about a theoretical win and subsequently, acts to further normalise the solitary conditions of economic insecurity.

We do not take issue with this critique of the often calculated corporate practice of hackathons. Gregg’s eagerness to disavow this practice, however, assumes that those power-knowledge relations embedded within capitalist working relations are both fixed and reified, sidelining any possibility of struggle that arguably exists within the means of production or in this case the hackathon as a modality of participation. Yet, technologically-engaged participation is the cohesive dynamic in the hacker ethos as outlined in Levy’s (1984) tenants. And while Gregg’s corporate example gives credence to Kelty’s (2008) charge that elements of the hacker ethos can become a reified norm from a now past historical moment, this does not require a disavowal of collective technical action. Simondon (1958) stresses the importance of collective techno-cultural action. He would not dispute the gravity of estrangement from the means of production, which Gregg puts forward by proxy with the hackathon.⁵ However, Simondon fundamentally differs, insofar as

4 Often hackathons extend over two days. Those undertaken in our research – namely in the *Our Data Ourselves* project – took place over only one day.

5 Simondon would likely agree insofar as he acknowledges the need for “offsetting that form of alienation that occurs in the very interior of the development of technology, following the specialization that society demands and produces.” (Simondon 1958: 101)

he refuses to reduce technology to being primarily a tool of production. Elements of a technical object always have potential – an *excess* – beyond their situated utility. This is the crux of his critique of a reductive cultural understanding of technology; indeed, he considers this misapprehension to be a crucial source of alienation. In this way, machine-induced alienation is also a cultural alienation.

Barthélémy clarifies the culpability of culture in our alienation from technology: “it is the culture itself that feels the consequences of an ignorance by which it had defined itself as a work-based culture” (2010: 248). Instead, he argues that we need to liberate the machine and to do so, culture needs to understand technology not only through but beyond labour. What this requires is a different relationship to technology itself, seeing that in addition to being a tool of labour and exploitation, there is also a techno-human capacity for the translation, the conversion, the transduction of disparate potentials and realities. Simondon posits the need for a different understanding of technology to enable new kinds of inter-human relationships, for becoming something *other than*. Such transductions all require collective endeavours of technical invention, and it here that we posit one of many possible roles for the techno-cultural workshop.

Practicing Techno-Culture

On a spring day in 2015, we held a six-hour workshop at King’s College London. Participants ranged from hackers, computer scientists, humanities scholars, undergraduate students and interested members of the public. The backgrounds of the 21 participants was extremely diverse, each with varying capacities in relation to computing, reading code and engagement with open source software. The workshop was orchestrated to reach a wide and disparate set of publics through an open invitation that explicitly welcomed all levels of expertise. Furthermore, ongoing support was promised to those lacking computer and/or data literacies skills to enable them to discover and unpack the basic movement of data that is continuously extracted by Android mobile applications. The aim of this session was not to transform novices into experts but to create an environment wherein all participants could i) gain a deeper understanding of the permission protocols embedded in all application housed in the Google Play Store; ii) create a pedagogical space that inspired the “messiness of methods” (Law/Urry 2004: 390) so participants could collectively consider the diverse ways in which their own data assemblages shape their ontological conditions by using pre-rooted Android phones; and iii) consider ways of reconfiguring the data by empowering those with limited technological skills to gain insight into the mechanisms that facilitate the collection and distribution of their data. Overall, we hoped to cultivate more agency and transparency, opening up the black box of the otherwise opaque complex technical networks comprising mobile applications.

Similar to Ruppert, Law and Savage (2013) we were interested in the methodological possibilities that can render visible how data articulate relationships between the cultural, social and material. The workshop, therefore represented more than just an instrumental gathering of bodies with a task at hand, but instead functioned as a site of action based research. Thus, in line with Kennedy et al. (2015: 176) we see possibilities for “an intimate relationship between scholarly inquiry and practical or political activity or intervention” in the social data we routinely produce when using mobile applications. Indeed, we hoped to empower participants to actively understand how apps gather data by directly engaging and discovering aspects of their material infrastructure. By so doing, we created a temporary data public, echoing what Kelty (2008) calls a recursive public. However, unlike with his recursive model, most of our participants were not geeks (although some were) and our objective was not to *create* but rather to *discover* those technical objects and make them accessible for critical use. It is also important to note how the composition of this workshop arose organically through a series of earlier hackathons in our research projects. Initially, we focused exclusively on teen hackers but later when re-deploying this method for post graduate and undergraduate students without the requisite skill sets, we recognised the merit in a more diverse and inclusive collective.

The ‘Hacking the Mobile Ecosystem’ workshop was designed and led by Giles Greenway and Daryn Martin as a part of our AHRC project which explored the datafication of mediated youth cultural and social practices on mobile platforms.⁶ The workshop was inspired by a key finding in the *Our Data Ourselves* project, regarding the irregular data activity of one of the applications – Line Keep In – used by two of our participants. According to our findings, this application had a data flow 35 times higher than the other applications we examined (Pybus et al. 2015). Upon inspecting the code, we found several embedded tools gathering deep statistics and pushing user messages, in addition to a much broader range of permissions seeking personal data access. The outcome from this more traditional hackathon prompted us to pursue further research questions such as: How are apps coding to access data? What is the average amount of data apps access? What kinds of data is accessed? And finally, where does this data actually go? In addition, we also wanted to expand the parameters of the workshop to function as methodological tool. Thus, on the one hand, some participants dug into the source code of the ‘Line Keep In’ application, and on the other hand, our more inclusive environment enabled non-hackers to explore their own mobile applications via the permissions that facilitate data flows. In this manner, the workshop demonstrated the potential of a truly techno-cultural heuristic method.⁷

6 For a more extensive overview please refer to Blanke et al. 2014.

7 Here we used heuristic to denote both a Computer Science definition which signifies a problem solving approach emphasising speed over optimisation, capturing the temporal dimension of a workshop, and for non-expert technological engage-

On the day, participants were given pre-rooted Android phones, which enabled them direct access and control over the operating system and applications that had been installed on the devices they would use in the workshop. Unlocking, rooting or jailbreaking mobiles is a common practice for many hackers or app developers since a rooted device offers complete administrative control, albeit at the cost of voiding the warranty. The workshop introduced the technical elements of rooting a phone as a means for increasing user agency over the operating system and applications on their devices. For example, an unlocked phone can open up unavailable features such as more comprehensive ad blockers, enable users to customise their operating system, or even remove unnecessary software to make more available space. What many of these practices equally enable is the extended life of otherwise old or obsolete phones, thus potentially disrupting the ever-accelerating cycle of mobile phone consumption.

For the majority of workshop participants, this was their first experience exploring the inner workings of an open Android phone operating system, let alone exploring the technical elements of mobile development. Participants were given the task of reverse engineering or decompiling mobile applications which provides access to i) the Android Manifest which defines how an app is structured by including the metadata of all of its components; ii) the list of permissions attached to the Android Manifest which govern the level of access that the application has to user data;⁸ iii) the packets of data that pass between the mobile and the server; and iv) for the more advanced, the app's code to determine which third party agreements were present. In order to accomplish these goals, participants downloaded 'virtual machine' (VM) software, which enabled them to run multiple operating systems on their laptop; for example, working within the Android environment while using a MacBook. Greenway and Martin designed a user-friendly VM for participants to augment the capacity of those who were less technologically literate, deploying an array of software which rendered the laptops into inquisitive, critical and creative communication tools, ready to work with rooted, that is, unlocked mobile phones.

There are three key tools worthy of note which enabled this process within the VM. First, the Android Debug Bridge allowed participants to drag mobile applications from the phone onto to their laptops for closer examination. Second, the F/OS reverse engineering tool dex2jar⁹ which decompiled the app – that is, broke it

ment seeking a critical understanding of the social and cultural dimensions of processes of datafication within a mobile ecosystem. See Bardin (2016) for a related and insightful discussion of heuristic efficacy.

- 8 The typical user would never actually sees the permissions in the manifest, instead s/he would see the outcome of such permissions as part of the terms and conditions that outline the various ways in which data is accessed and shared by the application.
- 9 This program makes the information from the Android Manifest visible by translating dex code which is in machine-readable Android bytecode format into jar code, which can then be made human-readable format through a Java decompiler.

open to reveal its technical elements. More specifically, this rendered the machine readable code that programs the application (including the manifest) into more human-friendly Java. Third, the F/OS network packet analyser Wireshark was preloaded to capture and to try and make sense of the data flows. Here, 'Packet sniffing' is a crucial step, which makes visible the normally obfuscated traffic between the application and the server. It is important to note, that the intent of this workshop was not for all participants to drill down to a fine granularity of data flows, although some did; rather, it was to foreground the pedagogical and affective value in actually seeing and experiencing the direct movement of personal data. Within a techno-cultural context, the demystification of this otherwise inaccessible process is highly relevant to all, not simply hackers seeking to modify an application.

A crucial aspect of the techno-cultural workshop is its interdisciplinary bridging, how it is open to different users, goals, tools and their application. Hackers, or just those with more advanced technical skills were able to both dig into data flows governed by an Android Manifest file, as well as subsequently modify the application to their particular needs. But there is a parallel process, a pedagogical space that breaks open datafication processes and thus grounds social and cultural critiques through engagement with the materiality of technical objects. The workshop thus becomes a point of diffusion, not where all become hackers (thus rendering meaningless the specificity of that subjectivity) but where the ethos and practice of critical engagement become open to others. This we see as political, given the aforementioned prominence of datafication in the articulation of contemporary power-knowledge relations. The techno-cultural workshop can function as a temporary collective to help undo divisions between "those who create data [...], those who have the means to collect it, and those who have the expertise to analyze it" (Manovich qtd. in Ruppert 2013: 270). In short, by facilitating temporary data publics, participants can make strange what through habituation is familiar yet unknown and unexamined in practice.

For example, by decompiling the application, participants were able to make visible the permission-based security files of the Android Manifest (AndroidManifest.xml) which governs data flows in and through applications. Some participants decided to examine Facebook's Messenger, and subsequently identified 40 different permissions wherein the application's developer coded legal means for gathering data from its users. So for example, if the user is logged on and sends an MMS message, the Facebook Messenger app or 'Orca' as it is referred in the Android Manifest, states clearly that by so doing, the app can read *all* of the user's texts. In addition, these permissions are also appraised by the Google Play Store, which rates the data gathering practices as being either 'normal', 'dangerous' or 'unknown'. Closer examination of Facebook Messenger revealed that 15 of its permissions were deemed to be 'dangerous'. A small sample of these include:

1. android.permission.ACCESS_COURSE_LOCATION ['dangerous', 'course (networked based) location', 'access location sources, such as the mobile network database, to determine approximate phone location, where available. Malicious applications can use this to determine approximately where you are.']
2. android.permission.CAMERA ['dangerous', 'take pictures and videos', 'Allows application to take pictures and videos with the camera. This allows the application to collect images that the camera is seeing at anytime.']
3. android.permission.SEND_SMS ['dangerous', 'send sms messages', 'Allows application to send SMS messages. Malicious messages may cost you money by sending messages without your confirmation.']

Upon reading the various permissions, our participants made a number of preliminary observations: A) How much clearer the manifest appears in terms of simply listing what data are gathered; B) How useful it was seeing the word 'dangerous', which drew attention to more invasive permissions; C) What does 'unknown' mean? And why is it listed this way?; D) Why does it appear that the Android Manifest appears to be more comprehensive and straightforward than the Terms and Conditions?; E) How might users interact with their apps differently if they had access to the Android Manifest? We regard such observations as crucial moments of translation which invariably arise from any critical techno-cultural engagement. By examining their apps from an entirely different perspective, participants can pose new research questions and open different approaches to critical data literacies.

Further consideration of these preliminary findings might lead us to conclude there is nothing entirely unusual about these permissions, insofar as they ascribe common functionality to apps. Yet, they are also fundamental to calibrating an extensive and intensive flow of personal data which underwrites the data-driven economy. Thus our participants also saw permissions which enabled cross-app and cross-platform data flows, third party access. Such permissions are crucial to the data brokerage ecosystem of marketing and advertising – an area we are examining in ongoing research. Overall, our brief workshop exploration revealed a contrast between the coding and its discursive representation in the Google Play Store. There is an informational disconnect between the banal matter-of-fact detailing of 'dangerous' permissions in the manifest, and the discursive rendering of the 'dangerous' into extended functional features as read by the user. This workshop experiences suggests to us a method open to much more than just the use of new digital tools for learning new data-intensive modes of empirical analysis, although this is one option. What we see is an opportunity to collectively investigate the mechanisms that facilitate the material relays that lead to the capture, spread, movement, and eventual commodification of our mobile data.

Theorising Techno-Cultural Practices

We present the ‘Hacking the Mobile Ecosystem’ as but one possibility within an emergent practice that we are trying to extend through theoretical reflection. As such, this is very much practice-led theory. In more straightforward terms, we, as non-hackers, first had to explore the hackathon before appreciating its broader critical and creative potential. In this manner, recent research projects have been a journey of discovery through such unfamiliar technology-focused practices. Further, there is a challenge inherent in heterogeneous interdisciplinarity when one enters with a structural deficit in knowledge and capacity. Thus we had to observe and learn about hacking practices so we could meaningfully communicate with coders, programmers and hackers. In working through these interdisciplinary *translation* issues, myriad possibilities oriented around rethinking and re-articulating social and political theory arose through the different ways in which we could engage the technology itself. This translation work, articulating the technical, socio-cultural and political economic, could also be understood through what Simondon calls transduction.

Mackenzie (2002) has an important and eponymous monograph illuminating the dense conceptual thicket underpinning relations between culture and technology. We are drawn by the very idea of transduction, which entails a conveyance and transformation of energy or a signal from one state or domain to another. At risk of oversimplifying, we could say Simondon’s core focus was to elucidate points of transduction between technology and culture, between disparate dimensions or realities. In this way, the interdisciplinary workshop as a zone of translation is also one of transduction. Above we outlined how workshops revealed to us the materiality of technical practices of datafication in mobile applications – what Simondon would call the technical object. In turn, this cultivates an understanding of the transductive relations to the cultural and the political. This brings us back to the basic political orientation of the techno-cultural workshop: *an emergent method for critically unpacking the data materiality of the human condition under datafication*.

But why the human condition, or rather human modes of existence under datafication? Given the ubiquity of datafication, we find it opportune to study through a particular realm of the Digital Humanities, the disciplinary domain under which the research projects informing this paper transpired. It is crucial to distinguish, however, that we see this realm not in new computational methodologies for humanities research but rather squarely on the condition of the *digital human* under datafication. Simondon was deeply concerned with the orientation of humanism. Barthélémy (2010) incisively recalls that Simondon gave the name ‘facile humanism’ to that which ignores the technical object. If we look to the first paragraph of his most significant work: *Du mode d’existence des objets techniques*, Simondon makes clear his intent: to overturn “the assumption that technical objects do not contain human reality” and that “the opposition raised between

the cultural and the technical, between the human and machine is false and without foundation” (1958: 9). Barthélémy calls this approach that of a “difficult humanism” (2010: 240) insofar as it integrates human and technical reality, as well as technology into culture. We claim that the techno-cultural workshop practices ‘difficult humanism’ as it both foregrounds the technical object and enables new examinations of technical life.

It is worth pausing on this point to restate what we propose as especially valuable about the techno-cultural workshop: a practice-led opportunity to rethink the contested relationship between the human, nature and technology, with a view to challenging social and cultural theory that ignores the human reality of the technical object. Barthélémy, on difficult humanism, writes “the technical object is the extension of life through which that life can go beyond itself in a relationship referred to as ‘transindividual’” (2010: 49). In other words, technology is the means by which the human, and thus culture, is expressed in nature. If we follow this through, the interdisciplinary workshop as techno-cultural method raises different ontological stakes when the focus becomes the *technical object*. But in order to appreciate the technical object, as presented by Simondon, it is worth quickly contextualising the theoretical paradigm from which it arises.

The very idea that the technical object has a mode of existence, an ontologising capacity or reality, begs the question of its relationship to the human mode of existence. The concept of originary technicity clarifies the calibration of this constitutive relationship by positing that the human and technology were always already linked. Leroi-Gourhan (1993) first popularised the idea of originary technicity in paleo-anthropology in the mid-1960s. His concept frames the shift in the mode of exteriorisation, when proto-hominids first picked up and fashioned rudimentary lithic industry. He posited it as the threshold of the human insofar as it transformed exteriorisation from a biological to a technical tendency. Human culture, thus, is always a technical expression. Derrida (1976) similarly drew on technical exteriorisation in his critique of logocentrism by unsettling the *natural* human and similarly the originary status. Stiegler (1998) also draws on originary technicity in his concept of epiphylogenesis, or the accumulation of experience in technics which in turn impacts upon the very development of the genus homo. Finally, Beardsworth (1996) sees political stakes insofar as originary technicity provides the platform for the differentiation and historicisation human spatio-temporal experience, a focus also taken up by Mackenzie (2002) and Hansen (2004), among others.

Technicity then, is the human condition. Stated otherwise, originary technicity highlights the supplementary nature that was always already human living systems. It is crucial to note that unlike Stiegler, Simondon does not see this supplement as a response to a lack. Instead, technicity is an expression of potential, wherein it manifests *the way life lives*. This means it ontologises, or makes real, a given relationship with the environment as well as enabling forms of social or collective life. Any given technical object – for example, a mobile applica-

tion – functions to interlace social, political, economic, and cultural dimensions. As such, technicity is crucial for a rigorous understanding of the possibilities of collective life – *the* political task *par excellence*. Here Mackenzie elaborates the techno-cultural stakes: “[T]echnicity refers to a side of collectives which is not fully lived, represented or symbolized, yet which remains fundamental to their grounding, their situation, and the constitution of their limits” (2004: 11).

It is the double articulation of technicity that makes the techno-cultural workshop a method for the ‘difficult humanities’. Technicity is both i) the dynamic which coheres the technical object, as well as ii) that which envelopes and articulates the cultural, or the organisation of collective life. In short, it is a method to critically unpack the mode of existence of the datafied human through a two-fold *political* elaboration of technical culture. First, it makes visible constituted power and control, engaging the normative and regulatory dimensions of technical objects which inscribe us more deeply into circuits of production and consumption – for example, in the coded permissions of Facebook Messenger. The second step, however, is crucial insofar as technicity is conceptualised as an excess, a dynamic which always exceeds the purpose or instrumentality of any given technical object. When a technical object is examined with technicity in mind, priority is given to considering how it is always open to something more, for example, coding permissions so data flows as a shared resource, thus differently organising collective life. We contend the double-articulation of technicity lends a political urgency to the techno-cultural method. On the one hand, this method begins examining technical objects of datafication which underpin the political economic commodification of the lifeworld – the social data factory – at unprecedented levels of fine granulation, and which in turn further refine and target mediated content which can distract and dissimulate. On the other hand, the technical object and its constitutive elements can always *become something more* than a regulatory and normative system. This is because its elements are always bound by technicity into a metastable system – that is, supersaturated with potential energy, like a snow-laden mountain slope, pre-avalanche.

Let us briefly consider how our workshop examined apps as a technical object, be it the ‘Line Keep In’ or ‘Facebook Messenger’ within the metastable system of datafication, and to consider the technicity cohering its elements. The first point is that life moves beyond itself through the technical object. This is similar to thinking of it as medium wherein nothing remains the same in relation to the technical object, not the sensory-perceptual lived experience of the human, the conditions of possibility of human collectivities, of socio-cultural practices, expressions and organisational forms, labour both in form and in relation to economic value, overarching spatio-temporal calibrations, and, indeed, the environment itself. As we worked through our different hackathons and workshops we found something irresistible about considering any given mobile app as a technical object. For Simondon the technical object is the means by which we are expressed in our lived environment, mediating the human and nature. This

gives an innovative frame for the data flows through those applications, which, after all are exteriorisations of the human, of quotidian quanta of everyday life. While we must consider the technicity of such datafication, we must first clarify the techno-cultural method.

Barthélémy reminds us that to ontologise technology – i. e. ascribe to it a mode of existence – is to reject its classification through utility. This is what he calls “the non-anthropological thinking of technology in Simondon” (2015, 51). So a techno-cultural workshop will indeed drill down to the defined use and practical ends of technical objects – namely normalising and regulating the flow of personal data. Yet it can also vet the technicity to consider how that technical object can be rearticulated and open up a vista beyond. For example, to consider permissions as technical elements, which can be modified, is to enact the excess of the technical object beyond the intentionality of its invention or its utility. To restate, the dynamic force binding the myriad elements comprising a given technical object can never be contained in any given social system or use case. Hence the crucial role of technicity. Simondon writes: “technical objects result from an objectification of technicity; they are produced by it, but technicity is not exhausted in objects and is not entirely contained in them either” (1958: 163). As per metastability, technical objects are only ever provisionally stabilised and thus always susceptible to being opened up and their elements reconfigured, becoming something else. The iterability of technical objects comprising the Android mobile ecosystem testifies to this, the fact that it relentlessly commodifies our data notwithstanding. Iterability always marks the technicity adhering a technical object. This capacity to knit together and bring cohesion to diverse elements is why Simondon denotes that technicity functions as “a unity of becoming” (1958: 20) amidst a network of relations.

Technicity always binds a particular set of elements in a grounded situation. It is not a glue to be used once and the tube discarded. As Simondon writes, “technicity is not exhausted in objects and is not entirely contained in them either” (1958: 163). There are two things of note about this super-abundance. As stated, the elements comprising the technical object always contain the potential to become something else. We also suggest there can be a more autonomist reading of technicity, as a kind of constituent power. Such a political reading ascribes a pre-natural potential across the modes of existence of the human and the technical. As such, technicity has something of a contestable *hominem ex machina*. This underlines the overarching critical but non-prescriptive political impulse behind the techno-cultural workshop when it enables participants to go beyond the normative regulation of its intended use, and that is the possibilities for other forms of organisation of collective life. As such it is an open method for developing a social pedagogy of technics.

Conclusion

To conclude, the techno-cultural workshop builds on the critical, creative hacker ethos of technological engagement, and the collective practice of the hackathon. We see this as an innovative method for opening up the materiality of computational media and data flows as a way to better grapple with the socio-cultural and political-economic dimensions of datafication. This responds to a call Hansen (2004) made, for the *transcultural* transformation of cultural studies. We see this as a challenge for the techno-cultural theorist: “to become together with technics, to engage in mediations by and with technical objects that place the human in relation to the inhuman, the improper, the preindividual ...” (2004). The techno-cultural workshop is an opportunity to put this into practice and better understand the digital human under datafication. Further, the preindividual resonates with our conceptualisation of the social data we generate: as an *emergent commons*. Indeed, our original hackathons were designed to empower participants to explore that commons, to access their own data for creative and critical use. Here we put forward a provocation, following the Simondonian concept of individuation. What if the techno-cultural workshop helps us think differently of the data we generate? One might be inclined to think of data through Stiegler’s (2011) interpretation of tertiary memory. He identifies this with the industrialisation of memory, the kinds of mediating cultural texts one would traditionally associate with the Frankfurt School’s culture industry. As evidenced in our workshop’s examination of the technical element of permissions, we do know the social and cultural data we generate constitutes a fundamental relationship: it is fueling the evolution of commercial digital media and indeed inscribes us ever more seamlessly in circuits of its production and consumption. But one of the prime virtues of a Simondonian frame is that it looks beyond normative and regulatory utility; hence the foregrounding in the techno-cultural method of the excess of technicity. We would add to this another excess: the ever present *constituent power* of the human. This renders our social and cultural data not merely functional for the social data factory but as a possible “means for the human to draw on its preindividual, natural support, which is to say, to persist as an ongoing individuation and to participate in collective transindividuation” (Hansen 2004).

If we think of the data we generate, in terms of its immanent *social life*, it is only already constituted insofar as it is subject to the regulatory and normative applications of capital and the state. In other words, it is the quotidian quanta of already constituted individuals flowing through our mediated social and cultural practices. But that is not all. The unprecedented market value of this data comes from what happens next, after it flows forth into that rich social life of being brokered, aggregated, processed, and analysed in a closed and proprietary system. It then comes back to us, reinscribing the constituted individual with a regulatory and normative force that transpires in an increasingly pre-cognitive temporal mode.

What more can we learn from the techno-cultural method about both the dizzying temporality and non-conscious cognition of technical devices (Hayles 2014) increasingly dominating these flows? For certain there are rich political possibilities in exploring the technicity of this data, a very particular excess manifested in its inexhaustible relationality. The excess of the data we generate is that it can always be linked anew, in collective relations previously unknown. This is the red thread for a techno-cultural workshop. Interventions in the technical ensemble of datafication, opening any given technical object gives us new means to draw on our data, not just to temporarily decompile its regulatory relays, but to directly engage what Simondon calls “the charge of preindividual reality, of this charge of nature that is conserved with the individual being and that contains potentials and virtuality” (1958: 248). Above all else, beings for Simondon are *beings with potential*. Techno-cultural practice composes relays between human and non-human potential, expanding our collective capacity to act. From the modest platform of a mobile ecosystem, we can “construct a new modality of relation, a modality of transductive relation of human to nature and transindividual relation between humans” (Combes 2013: 70). Opening up the flows of our quotidian quanta opens one practical possibility for seeing and forming new relations with what is also a preindividual dimension. Such new relations are crucial to the collective formations of transindividuation, which requires a transduction – a conveyance and transformation – of human and technical elements. Here we concur with Hansen that analysis must become a performance, and, we would add, a practice, “a creative experimentation with the possibilities of our future technogenesis” (2004) which after all, denotes the kinds of relationships we have with technology. Technogenesis, simply, denotes new ways in which life lives through technics.

Under ubiquitous datafication, the technical existence of humans has never been more apparent. But there is, as Combes (2013) reminds us, neither “freedom from” or “mastery over” machines. But what we can do is open the technical system from below. Each time a techno-cultural workshop is enacted, it performs this task. As Bardin and Menegalle (2015) note, this is the crux of Simondon’s pedagogical programme: “starting at the reprogramming of individual cognitive capacities towards collective processes of individuation that do not merely resist but invent and experiment in the human techno-symbolic milieu (1958: 16).”

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