

The Role of Technology in the Making of a Thesis Whisperer

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This paper explores the notion of the human-technology hybrid, seeking to understand how 'smart' technologies are enmeshed with humans in their fleshier forms to assemble different identities from moment to moment. One participant – Associate Professor Inger Mewburn, Director of Research Training (DRT) at a research-intensive university and founder of the blog The Thesis Whisperer – was shadowed as she interacted with the human and non-human actants within her network to produce and sustain various identities. The goal of the study was to illuminate aspects of the DRT's working day that are not accounted for in her job description or performance plan, but are crucial to her success in her role; that is to say, the 'invisible work' that she undertakes, and the ways in which she enrolls, translates and works with or against various technologies – and they, her.

In exploring three forms of invisible work – a) where the employee is visible but the work is invisible, b) where the employee is invisible but the work is visible, and c) where both work and employee are invisible – we argue that it is critical for university administrators to understand the invisible work that human/smart technology hybrids are doing within academic environments in order to best manage their rapidly changing workforces and the organizational climates in which they work.

Keywords: Actor-Network Theory; Invisible Work; Shadowing; Academics; Universities as Organizations; Technology

Introduction

What do technologies *do to us*? It is a contentious question that makes a number of also contentious assumptions. Firstly, it assumes that technologies *do things* — that they have the power to affect change and to have an impact on the humans and non-humans around them (Bennett 2010). Secondly, it presupposes that those effects are wrought on *us* — humans — implying that we can in fact be influenced by something that, ostensibly, we as a species created to serve us, and to service our specific needs. By acknowledging the power that technologies can have over us, we also accede some of the control we feel we have over our lives and our time.

Bruni (2005) in his ethnography of an electronic patient record system in a day hospital, described shadowing non-human actants as being akin to Alice's game of croquet in Wonderland, in which the croquet sticks were live flamingos, the ball was a hedgehog, and the entire playing field refused to behave as Alice felt a croquet field should. Bruni uses this analogy to describe the way that non-human actants sometimes seem to 'have a mind of their own' or behave independently of the intentions humans have in mind for them, and the human actants are left scrambling to catch up. Yet at other times, it is clear that technology facilitates outcomes that humans could not achieve alone.

This paper explores the entanglement of technology with flesh, and the way these together can do the work of producing a senior manager in a (neo-liberal, market-oriented, Australian) university. This reference to a 'network' relates to the philosophy of Actor-Network Theory, a key influence on this study, and a particularly useful tool in exploring the way that technology — a non-human actant — plays its part in affecting change in an organizational context (Cresswell et al. 2010). Using ethnographic shadowing of a human participant (Associate Professor Inger Mewburn, the Director of Research Training (DRT) at a high-ranking, research intensive university, and a coauthor on this paper) and the non-human technologies she engages with on a

day-to-day basis (such as mobile devices and gadgets, software programmes, electronic equipment etc.) this paper examines the behaviours of technologies and humans as they contribute to, facilitate, and sometimes domesticate, the actor-networks in which they are enrolled.

Actor-Network Theory: A brief overview of a philosophy (despite its misnomer)

Actor-Network Theory, or ANT, reminds the researcher to examine all the ways that a actor-network is being assembled and to seek the traces of the actor-network in all its forms, both human and non-human (Latour 2005). A study of a university is a good illustration of this assembling process in action. Universities are not just a collection of buildings, nor are they merely a collection of people; instead, in the ANT way of thinking, a university is an assemblage of ‘actants’, each with varying ability or power to do things and alter the course of events (Bennett 2010). An actant might be a physical space or spaces, the academic and non-academic staff, the students, the food and beverage providers, the foods and beverages themselves (no-one who has observed an academic seeking coffee in the morning could possibly doubt the power that a beverage has to alter the course of events!), the books, the ideas within the books, the policies that exist to attempt to control and govern ‘the university’, the ideas people have about these policies, the technologies that people use to navigate their experiences on and off campus — one could literally keep going on forever, because one of the difficulties of ANT style studies is the difficulty of knowing where to “cut” the actor-network (Strathern 1996).

An actor-network such as a university is being assembled on a moment-to-moment basis as the different actants intersect and interact in new ways — for example, if a scientist intersects with a) a piece of equipment, b) a particular chemical and c) another scientist in a new way, suddenly a new discovery can be made that may bring ‘the university’ international fame and may even change the course of history. This discovery may then be enrolled as a new actant in the university network, producing a series of new effects that may also go on to make changes to the network, such as if the discovery attracts more funding to the university.

Because the actor-network is constantly being assembled, it is inherently malleable, although it may appear extremely stable and durable to both the actor-network’s actants and those ostensibly external to the actor-network. In the case of the university actor-network, there are many actant assemblages that appear highly durable as they have been assembling in similar ways for hundreds of years — the assemblage of a student, a black gown, a floppy hat, the university’s Chancellor, a stage and a rolled-up sheet of paper have, for example, been doing the work of creating new doctors of philosophy since medieval times (Hargreaves-Mawdsley 1963).

However, even this network-within-a-network is not as durable as it appears on the surface, because in addition to the visible actants described above, there are many invisible assemblages hidden from the view of the observer. What the casual observer (who, naturally, is yet another actant) is unlikely to detect at a graduation ceremony, for example, are the many people who undertook months of event management, or the computers, smart phones, and laptops that have been used to store, collate, curate and mediate the data about the event, the speakers, the students graduating, the members of the academic procession, and so on. Law (2004) calls these hidden parts of the actor-network ‘the hinterland’, using the analogy of the agricultural processes that must occur (usually in the physical hinterlands of a region or country) in order to bring a plate of food to a dining table. Because we can only see the outcomes, rather than the processes that occur in the hidden parts of the actor-network, we may also miss the myriad ways that the assemblage of graduation has changed since medieval times, demonstrating that it is not in fact as stable as it appears on the surface.

The value of ANT in organizational studies is its commitment to seeking out the work that has been done by the many actants to build an actor-network to the *appearance* of durability, for once this is known, it may also become possible to understand how an assemblage can be better maintained, or conversely, destabilized and changed (Bueger 2013). ANT provides a toolbox for studying informal politics, analysing situations in which the various actors comply or refuse to comply with the identities that conventional models describe for them, or where organizations experiment with new forms of governance that are unfamiliar in the literature or are yet to be formally categorized by social science (Bueger 2013). This is the case in the changing university

landscape.

This study takes what Fenwick (in Fenwick & Edwards 2012) calls an ‘ANT-ish’ approach to network analysis: that is to say, that we hold the various sensibilities that ANT has offered throughout its history close to our hearts but with a loose grip, in order to cherry pick from both traditional ANT approaches and more recent interpretations of ANT that best suit our study. This has allowed us to apply our ANT-ish approach to the construct of ‘invisible work’.

Invisible work and how ANT can make it more visible

First Suchman (1995), and later Star and Strauss (1999) popularized the term ‘invisible work’ to describe labour that is undertaken by some members of a workplace but not others; work that is expected, but not accounted for formally in job contracts. Star and Strauss (1999) referred to three types of invisible work:

- when the worker is invisible, as in domestic work;
- when the work is invisible although the employee is visible, such as the caring work undertaken by nurses;
- and when both the work and the employee are invisible, as can be the case with professions where much of the difficult work is undertaken ‘backstage’ (Goffman 1958), or where the observer sees only the end product, not the process.

However, what Star and Strauss’s (1999) construct of invisible work does not take into account are the non-human actants that are also performing invisible work within a workplace actor-network. It is our contention that invisible work, when conceptualized as being performed by both human and non-human actants, holds similarities to the concept of the black box in Actor-Network Theory. Latour (1999: 304) in his glossary of *Pandora’s Hope: Essays on the Reality of Science Studies*, defines the act of blackboxing as follows:

An expression from the sociology of science that refers to the way scientific and technical work is made invisible by its own success. When a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeed, the more opaque and obscure they become.

In *Pandora’s Hope*, Latour posits that we become painfully aware of the work that non-human objects — in the cases he is describing, technologically advanced machines — have been doing to maintain an actor-network only when they fail, and thus cease to do that work. It is a case of ‘not knowing what you’ve got ‘til it’s gone’, as the saying goes. So if we look at an actor-network as a web of heterogeneous actants, of both human and non-human nature, then we must explore the invisible work that both are doing within that actor-network that both facilitates and resists its successful maintenance.

This is our hope for this paper. Using all three of Star and Strauss’s aforementioned forms of invisible work, we explore the work that is being performed by the combined human and technological actants in the actor-network called the Director of Research Training at this high ranked and research-intensive university. We did this using an ethnographic method known as shadowing.

Shadowing humans and non-humans

Used with increasing frequency in the discipline of organizational ethnography, shadowing involves intensively following a single actor in an organization for an extended length of time (McDonald 2005) in order to understand one *type* of actor’s experience of interacting with their environment, rather than trying to understand the whole environment, as is the case with typical participant observation. In Goffman’s (1958) terms, the shadowee is allowing the researcher backstage access, and because of the intensive and protracted time spent with a specific actor, the data that is gathered about those backstage processes is likely to be very rich, dense and detailed, and in the case of shadowing humans at least, will reflect not only the participant’s

behaviours *or* their opinions, but both. This is because in addition to observation of the quotidian nature of the actor's activities, the researcher elicits a running commentary from the participant, intended to both clarify the researcher's observations, and also evoke the participant's thoughts, feelings and justifications for their actions (McDonald 2005). Shadowing of humans can be a particularly useful technique in organizational research, not only because of the mobile nature of many employees (Czarniawska 2004) but also because invisible practices may be going unnoticed even by the participants themselves (Czarniawska 2007) and thus they would be unlikely to mention them in an interview setting.

There has been increasing interest in the ethnographic study of non-human actants, in spite of the differences in methodological approach required (Bruni 2005). Czarniawska (2009) posits that this is because using an actor-network approach, and thus privileging the non-human actants, reminds researchers in organization studies that working worlds do not simply appear out of thin air; they are assembled using entities that already exist, and that it is the effect of this assembling process that thus creates [an] organization. She argues, therefore, that we should be studying the continuous process of assembling these human and non-human actants if we wish to study and understand 'organizations'. However, we are also always tasked with remembering that an organization is not a fixed and stable entity, but is in fact fragile, and reliant on each of the actants in the actor-network continuing to behave as they have done in the past, or at least in ways that do not destabilize the behaviour of other actants.

Various authors have actioned studies in this manner. In an earlier example of shadowing non-human actants (although she never describes it as such), empirical philosopher Annemarie Mol (2002) shadowed the disease 'atherosclerosis' for four years throughout a large university hospital in the Netherlands. The use of this technique led her to the conclusion that there was in fact not a single 'atherosclerosis', but that different atheroscleroses were actually being performed (she prefers the term 'enacted', as she wishes to avoid the association with Goffman) throughout the hospital, and each different way in which these multiple atheroscleroses were enacted had different implications for different actors. Crucially, Mol appears to be making a point not so much about disease but about the way we can understand diseases/hospitals/people/organizations if we attend to them with an eye to how concepts are enacted into reality. If we draw this conclusion into a study of the role of the Director of Research Training, we can easily imagine that there may in fact be multiple DRT's (and also multiple Ingers) being enacted all over the university, and potentially all over the world, at different times — for example, the DRT that is identified in university policy documents governing PhD student training¹ is not the same DRT who writes and comments on weekly blog posts to PhD students all over the world. Although they have the common element of both being enacted in written English, Policy-DRT appears almost completely static, as if the DRT role is nothing more than what is outlined in a PDF document that has been uploaded to the university intranet, while Online-DRT combines: elements of Policy-DRT-ness; with elements of Inger-ness; with various technological innovations, to enact a DRT who appears inherently more human, compassionate and "messy". However, this DRT is simultaneously still distant from the reader, given the medium of communication through writing and through a platform of technology that enables and facilitates the interaction.

And these DRTs are different again, of course, to the fleshy, bodily-present DRT, also known as Inger Mewburn to those she interacts with in this role. Barnacle and Mewburn (2010) have demonstrated that a particular role is recognized as such, not only because of the physical body that currently inhabits that role, nor because of the knowledges, skills or values that the mind attached to that body may carry, but because the person inhabiting that role also enacts a range of other, non-human elements — their office, their choice of clothes, the books on their shelves, and the technologies they use to communicate with other human and non-human elements of their actor-network — and these elements "stretch out into the network of materials, somatic and otherwise, that surround each body" (2010: 435). Thus we can see that even the Flesh-based-DRT is not simply 'Associate Professor Inger Mewburn', or even simply 'Inger', but that these are two elements that currently make up the actor-network of just one of the multiple DRTs.

If we accept these premises (and many will not, but it is our job to explore, not to persuade at this time, so

¹ Here, we are arguing that policy documents do work within the university, and it is this work that produces yet another DRT reality, but this is not the same DRT reality enacted through Inger's Thesis Whisperer work.

let us imagine that we do), then each of these DRTs, and many others besides, are enacted through different assemblages of actants, particularly technological innovations that Inger enrolls (sometimes against their “will”) to assist in assembling these actor-networks. It is to these assemblages, and our methods of exploring them, that we shall now turn our attention.

Method

This qualitative, para-ethnographic study was undertaken as the pilot study for Jodie’s PhD. Ethnographic methods are not a prerequisite to employing the ANT philosophy (Bruni 2005); however, in our case, we felt that it would offer the richest data and would be the best tool for prying open the black box that the role encompasses. The notion of para-ethnography entails involving the ‘shadowee’ as part of the research process, and is used most frequently in contexts where the key informants are also conducting research or other forms of knowledge work (Holmes & Marcus 2008). In the case of this project, the researcher – Jodie – collaborated heavily, both in the design of the project and in the shadowing experience, with the human shadowee – Associate Professor Inger Mewburn, the Director of Research Training (the DRT) – who provided constant commentary, not only on her thoughts, actions and motivations, but also at a meta-cognitive level, regarding her thoughts *about* her thoughts, actions and motivations during data collection. For the purposes of clarity, we shall each refer to both ourselves and each other by name throughout the article, irrespective of who is writing.

The Shadowee

Associate Professor Inger Mewburn has been an employee at the university for several years, having been headhunted into the role of Director of Research Training based on her extensive online presence — she runs a very popular blog for PhD students called *The Thesis Whisperer* — and her experience training PhD students and researchers in previous job roles at another university. Although Inger’s PhD and professional background come from Architecture, she describes herself as having ‘fallen into’ research education and found her true love. When wearing her academic hat, she is an Associate Professor² who conducts ‘research about research and researchers’, and continues to publish frequently ‘as a hobby’ and ‘to keep her hand in’ although it is not a requirement of her Directorship.

The Setting

The field site was a research-intensive university, frequently ranked number one in Australia. Australia has undergone moves towards neoliberal governance structures in higher education over recent years, and this is widely touted to have had a marked impact on the employees working in the sector³ (Marginson & Considine 2000). ‘Research Skills and Training’ is a small team within the larger ‘Office of the Dean, Higher Education’, and is led by Inger as the DRT. Research Skills and Training is materially situated in a small but modern building, co-located with various other related work groups, including the Digital Education team. This is important, because at the time this study was undertaken, Inger was in the process of collaborating with the Digital Education team on several large-scale digital projects.

The Work of Exploring the Work

One week prior to the shadowing week, Inger and Jodie met to discuss each party’s expectations of the week — would shadowing occur in bathrooms? Coffee catch ups with work friends? On the journey to and from work? It was determined that bathroom time, as well as activities beyond the physical scope of the university would be off-limits, while the various meetings occurring throughout the work week would need to be negotiated with the other meeting participants on a case-by-case basis. Emails were sent to the participants of other formal committee meetings, as well as informal catch up-style meetings, informing them

2 In Australia, this is the second highest of five academic levels.

3 We point this out at the risk of offending actor-network purists with an allusion to structural influence — in fact, we see the idea of the neoliberal agenda in higher education as one of the actants in the network, as it circulates the university doing various forms of work.

of the existence of the project and asking if they would allow Jodie to attend and observe, with the knowledge that Inger, rather than other meeting attendees, would be the focus of the study. This resulted in the majority of Inger's contacts being willing to let Jodie sit in. For those that declined, Jodie waited nearby but out of sight and hearing for Inger to emerge, then Inger and Jodie discussed any aspects of the meeting that did not break confidentiality.

Each day of shadowing began in Inger's office. Jodie and Inger had agreed to meet each morning to debrief on the previous day's shadowing, and then go over the next day's schedule; however, this was largely impossible given the ad hoc nature of Inger's working life. Thus, instead, most mornings involved Inger doing a walk-around of the office space to see who was in and what was going on in each of her colleague's lives for the day, before settling down to emails. Jodie carried a Livescribe notebook and smart pen to make notes on anything that appeared relevant to the project. These notes were then uploaded, converted to type-text and coded using the Dedoose qualitative coding software — a translation process worthy of note, for it was impossible to *truly* capture the fleshiness and tangibility of Inger's working day with mere ink on paper, or typed text on a screen. We have, however, done our best to convey what we can to you here.

Findings

Broadly speaking, the findings of this study were that technology was an important facilitator in achieving the goals held by both the DRT role and by Inger, although for most of these goals, technological aids were only one of many elements enacting these actor-networks. However, the various inadequacies of the technological devices Inger interacted with also created resistance to both her own goals and the goals that the university as an employer held for her role, causing her to waste time creating workarounds, and feeling constricted, even domesticated, by the technology that controlled her daily lived experience at work. She referred to this experience as 'the tyranny of tiny tasks', and although this notion was not used exclusively to discuss technology, this was a recurring theme in her use of her various technological workarounds. Nonetheless, she felt that she "more than broke even", and strongly identified herself as being "pro-technology", and even more strongly "anti those who are anti-technology":

Inger is in a meeting with a member of the university IT department. The IT person is new to the university, and is trying to identify the most important technology-related challenges that the university faces. Inger laughs ironically. "I suspect your biggest problem will actually be convincing the academics — some of the academics, not all of them, but still — that technology isn't evil, that it's something worth engaging with. A lot of academics don't like technology at the university level because there's a culture of 1996, and 'If you capture my teaching online then you've captured my soul, and then you can control me, or sack me, and then the robot overlords will take over.'"

This section will outline two of the major themes that emerged from Jodie's field notes about the ways that technology was enrolled into the actor-network of the DRT, and also, the ways that various technologies enrolled Inger into the actor-network of the DRT: technology for the management of identity, and technology for the management of time.

Technology for identity management

The various technologies that Inger interacted with throughout her day were often enrolled into her acts of identity management. As discussed in an earlier section, Inger physically embodies one of the DRTs — the fleshy one, as opposed to the DRT enshrined in policies, or the online-DRT, as examples — however, she relies heavily on her various devices to allow her to do this successfully. Key amongst these is her iPhone, the latest and most advanced model: a gleaming silver machine that not only helps her to manage and maintain her other identities, but is also a physical manifestation of her identification with modern technology — "Inger as Tech-Head". Inger's iPhone never strays far from her hand, much like a familiar, always ready to leap to its mistress's bidding. Consider the following scenario, drawn from Jodie's field notes:

Inger is attending a committee meeting, held in one of the university's 'case study' seminar rooms

that are a throwback to the 70s. The semicircular pews sweep the perimeter of the room, gleaming subtly in forest green leather and teak. Because of this rather odd choice of meeting venue, I am seated a tier above, and almost directly behind Inger, allowing me a clear view of her phone screen throughout the meeting.

Inger is an active participant throughout the meeting. However, despite her obvious involvement, I can see that she is also working on her phone throughout. In one of the tabs that she has open, I see that she has downloaded the meeting agenda and accompanying briefing notes, and when necessary she refers to these, quoting directly from her phone. This seems to position her as the ‘source of truth’ in the meeting, as the other meeting attendees begin orienting towards her for clarification and confirmation – i.e. although she is not the chair, the other attendees defer to her and frequently let her have the final say before a decision is made.

However, I can observe from my elevated vantage point that despite this, she is in fact flicking back and forth between the tabs and apps of her phone, from the meeting agenda to other forms of work.

Although she is still listening and contributing, I watch her read and respond to an email about one of her staff. I sat in on a meeting about this difficult staff member earlier in the day and we later debriefed, so I know that she has been feeling conflicted, distressed, even angry about the issue.

As she hits the send button on the email, she is simultaneously congratulating one of the other meeting attendees on the success of a recently completed project. She sounds absolutely genuine, her voice warm, and her colleague glows in response – I wonder if the technology has contributed to her ability to feel those two things – anger about the email, and pleasure for her colleague – simultaneously?

The meeting moves on, and Inger’s opinion on the best way to manage a particular project is sought. She responds in “Inger as Tech-Head” mode: “I know someone on Twitter who would be useful for that actually. Hang on, I’ll get their Twitter handle for you.” Given her extensive social media presence — in addition to managing a popular blog, she also has more than fifty thousand followers on social media — this positions her as the resident expert on social media engagement, and she instantly supports this position by showing her easy familiarity with Twitter, a platform that many academics find confusing or confronting.

Throughout the meeting, multiple Ingers and multiple DRTs are working full time. In addition to email, Twitter and her meeting notes, she is also editing a survey she is co-creating on Survey Monkey with a coauthor in the UK. She tells me later that she wanted to get the editing done before her coauthor woke up so that she (the coauthor) could look at it over breakfast in the UK morning. These tasks are all pertaining to different professional identities.

There are also some Ingers being maintained in this meeting with whom the DRT identities do not overlap. As 3pm draws closer, Inger begins frequently flicking between whichever app she is working in, and an app called ‘Find My Friends’ which allows her to see where her son’s iPhone is. She watches surreptitiously, still participating actively in the meeting, as her teenage son (or his phone, at least) travels home from school. When he reaches their house, I see her shoulders visibly relax. She tells me later that her son is aware that she does this and kindly accepts it as one of his mother’s many motherly eccentricities. She calls this, ‘satisfying her mother gland’, and states matter-of-factly that her DRT identity sometimes conflicts with her mother identity, but there’s nothing to be done about that. I question whether, on the contrary, in a case like this, there is no real conflict; her phone does the work of maintaining both identities simultaneously. She replies, ‘Yes, thank god for my beloved iPhone!’, mockingly placing one hand tenderly on the phone’s back as it lies face down on her desk, and placing her other hand over her heart.

In this scenario, Inger’s iPhone allows her to manage her affect relations. It does this by doing the work of

emotionally distancing her from various issues enough to be able to remain calm and professional in her written work (via email and other communicative apps), AND simultaneously remain calm and professional in her fleshy form, within the meeting. But let's take a moment to reimagine this scenario without the iPhone, or perhaps more realistically but just as disastrously, if the internet had been down.

- No email — therefore no meeting notes downloaded, plus no opportunity to stay on top of emergent office problems while she was away, thus maintaining her collegial identity as omniscient and omnipresent.
- No meeting notes — how would she have positioned herself as the source of truth?
- No Twitter — claims of having a connection on Twitter would not have been as strong as she could not have backed them up with immediate evidence. This evidence gave her a source of power in the meeting.
- No Survey Monkey — would not have finished survey editing in time to send to coauthor by deadline, thus maintaining academic identity as reliable and on top of things.
- No Find My Friends app — no way to satisfy the mother gland, leaving her vulnerable to distracting worry about her son when she was trying to concentrate on the work of the meeting.

In discussing her observations with Inger later, Jodie joked that now she finally understood how Inger managed to “do the work of ten women”. Inger replied, smiling, “You joke, but honestly, this is the only way the job gets done.”⁴

Technology for time management

The way that Inger uses technology in her DRT role makes temporal considerations more acute for some things, and for others, much less so. Of course, on one hand, having almost constant access to email and social media — the means of acquiring work from others — and to tools like Google Docs, Survey Monkey and Dedoose on her phone and laptop — the means of carrying out the work that she acquires — means that there is very little time when Inger is “unplugged”. However, there are times in her professional experience when she is forced to abandon her instant communication forms, sometimes with unexpected consequences:

Inger has been presenting a workshop to PhD students for the last 90 minutes, and so has therefore not been checking her emails. As we walk back to her office, she pulls her iPhone from her bag: “Alright, let's see what disasters have befallen us while I've been unplugged,” she quips. She quickly skims her emails, then her face slackens, her eyes widening in disbelief. “Are you for real?” she appears to enquire of the universe. She has been “agitating” — her words — for the university to look into a particular issue related to research training for a number of weeks. Somehow, during the 90 minutes from 1pm till 2:30 on this previously innocuous Tuesday, the issue has come to a head and one of her superiors has requested that she prepare a briefing document that can be presented at an executive level meeting, first thing the following morning.

By this point, we have reached her office. Inger raises her standing desk to the appropriate height for “getting things handled” (this is a reference to the TV show *Scandal*, whose strong female lead provides the wallpaper on Inger's laptop, along with her trademark quote: “It's handled”). She opens her online calendar and begins to brutally dismantle her afternoon's plans to make room for this new task. After making several calls to rearrange the afternoon's meetings — a quick but intense mission requiring both the assertion of the authority of the DRT role, and the promising of future favours by way of apology — she carves out a gap and fills it with a single new entry: “Write paper for X”. She looks at it for a brief moment, expressionless. “There's an awful lot of politics, and drama, and emotional work involved in those 4 little words that is just not reflected in such a bland little statement.”

In this scenario we can see a range of ways that Inger uses technology to manipulate time to support the DRT

⁴ Throughout data collection, Inger and Jodie discussed the politics of obligation inherent in the DRT role, and we can certainly give a nod here, again, to the neoliberal agendas in higher education that manifest roles that cannot be achieved *without* reliance on externalities. But this is another paper.

role, but also, perhaps less obviously, ways that technology's role in the DRT's actor-network domesticates Inger into working within a range of restraints. Before smartphones, before we had constant access to email, would a boss have presumed that her employee would receive this written request and be able to action it in time? Perhaps more importantly, how much did the ability to neatly relocate calendar entries, tidily dragging them and dropping them to a new time and place, contribute to Inger's sense that her task — to rearrange a previously full afternoon of meetings — was actually not impossible, that it could be achieved, without her having to disrupt her mother/wife identity by encroaching on her plans for the evening?

While this example shows how technology persuaded Inger to participate in the actor-network within the restraints of time, in other ways, technology removes the constraints of time. Consider this scenario, in which Inger and her team are discussing their work running a Massive Open Online Course (MOOC) entitled 'Surviving Your PhD':

Inger drops by the office of a colleague who has been helping her run the MOOC. The colleague, another female PhD holder interested in ed-tech, has been editing a video of the MOOC's participants responding to that week's module. She has realised, now that it is really too late to change it, that almost all of the participants represented in the video are 'white women'. She feels conflicted about this because she worries that it is exclusionary, but on the other hand, they know from their analytics that this is a fairly accurate representation of their MOOC participants.

Inger agrees that it is a dilemma. "The point, the very flavour of the MOOC, and of using these videos at all, is to give the students not just a voice, but a body, a face, to make sure they are not just these bodiless entities. So we're engaging in identity work with them, and sometimes on their behalves, and identity work is always the hardest work."

In this instance, the technology — an online learning platform called EdX — allows the students and the MOOC team to interact using representations of their bodily fleshiness, while still allowing the students to engage with the course materials when the timing suits them. They can then upload their responses when they are ready, the MOOC team edits these responses into a coherent narrative of sorts and then responds to that narrative seamlessly. This asynchronous learning method obviously offers students greater flexibility, but also causes various disadvantages to both parties:

I ask Inger what the hardest thing about doing the MOOC has been. I know she and the team have had to pull some ridiculous hours to keep the MOOC afloat and I expect this to be her answer, but no. "Well, we've had to develop an escalation matrix for the moderators to use as they monitor the online posts. They have to do regular searches for keywords like depression, self-harm, suicide, things like that, and then they need to know what to do if they find them, because by the time we read the posts, the student may no longer be online. And sometimes, they don't use their real names, or provide any additional details about themselves. Doing a PhD can be such an isolating experience, and we know that a lot of the people doing our MOOC are doing it because they are not getting adequate support from their home institutions. So we see these terrible posts and end up having to trawl through Google, looking for whether they've used their MOOC screen name anywhere else on the internet that might give us a clue to how we can contact them, so that we can reach out to them. It's hard, because we've identified a real need in the community, but the medium sometimes makes it hard to address that the way we'd like to."

In this example, we can see that while time has been manipulated for the students' convenience, there is a conflict between the demands being made by two quite separate actor-networks. Online technologies exist in/travel through time with the actants in the online actor-network including online technologies (such as the EdX platform), internet capabilities, the hardware being used to interact with the content, and both typed and videoed responses created by the participants and uploaded. This gives the participants virtual bodies and voices in the actor-network, but these bodies and voices are frozen — they have been captured in time. However, as the "real time" actor-network of the MOOC team overlaps with this online actor-network, time is reintroduced as a crucial actant; potentially, one of life and death. For the various Ingers' and DRTs' actor-networks, this therefore creates a mismatch of goals — to give participants flexibility on one hand, but also to be able to interact with those participants in real time when necessary — potentially causing Inger and the MOOC team to undertake a great deal of identity work and emotional labour in order to manage these internal conflicts.

Discussion

As we mentioned in the introduction, Star and Strauss (1999) identify three types of invisible work. Let us explore each of these in the context of the above vignettes.

When the worker is invisible, although the work is visible

Star and Strauss (1999: 16) discuss this category in relation to “non-persons”, using the example of ‘women of colour’ who work in domestic service for white women, and then generalizing this to say that there are employees in every workplace who become invisible, as they undertake the work that no one else wants to do, and/or that makes others uncomfortable to think about. We argue that in the Director of Research Training actor-networks, often these invisible workers actually *are* non-persons — they are in fact the non-human actants such as technological devices or software systems that carry out the work that humans no longer need/wish to do for themselves.

Consider Inger’s use of Survey Monkey, in collaboration with her iPhone and at other times her laptop, to create and edit the online survey she would be using to gather data for one of the papers she was writing. In years gone by, the creation and administration of a survey would have been a much more human-labour-intensive event, involving first the handwritten preparation of the survey, making multiple copies of this, often by hand. This would be followed by multitudes of research assistants taking their bodily selves from door to door within the geographically located sample frame, asking the questions and hand-recording the results, storing them safely for travel, then returning them to the researcher, who may or may not have used a computer to assist with the statistical analysis of the gathered data (Groves 2011).

Today, in contrast, Inger and her coauthor (who is based in the UK) use software designed to make it easy to both create, administer and analyse their surveys to as large a sample frame as they could gather, in as short a time as possible, at low cost and with great efficiency. Importantly, the work itself remains visible in this instance — the methodological rigour required by peer reviewed journals makes it essential that each aspect of the research process be transparent. But over time, the tools used to do this — the “workers” as such — have come to be taken for granted as they have become so easy to use that they can effectively be forgotten.

As an aside, some will argue that it is the humans who created the Survey Monkey software that are ‘actually’ the actors in the actor-network in this instance, but we feel that this is only a part of the story. Although humans were involved in the creation of the Survey Monkey software, they also interacted with a range of non-human actants in order to be able to play their role in that creative process — this is but another overlapping actor-network that has intersected very briefly with the DRT actor-network in that moment.

When the work is invisible although the employee is visible

This is the case with much of the work that Inger does in her role embodying the Fleshy-DRT actor-network. As could be seen in all the vignettes above, Inger is a highly visible member of the university, who is often called upon to interact with university power brokers such as the Vice Chancellor and his various deputies, but is also very familiar to students and staff across all of the faculties due to her mandate of providing research training throughout the university. Further to this, Online-Inger, otherwise known as *The Thesis Whisperer*, is quite globally visible — *thesiswhisperer.com* has more than 60,000 subscribers, and as aforementioned, it was through this medium that her current employing university found her work and head hunted her for this job. But a lot of the work — the day-to-day grind — that Inger and her devices perform to maintain the fleshy- and online-DRT actor-networks is much less visible, such as the case of undertaking intellectual work by multi-tasking during the meeting, or the highly emotional work of monitoring the online contributions on the MOOC.

Interestingly, one could also argue that some of Inger’s devices are visible although their work is not. As mentioned earlier, Inger’s iPhone is never far from her fingertips — it has gained a degree of status both by its association with Inger, and by its own nature of being the most recent, most advanced, and arguably most desired smartphone on the market. However, it is doubtful that most of the other humans in the fleshy-DRT

actor-network, the ones who have seen Inger with her phone, know the full extent of how it enables her success throughout the day; certainly, as one of those humans, Jodie had no idea of it until she was allowed ‘backstage’ and started systematically observing its contributions.

When both the work and the employee are invisible

Star and Strauss (1999) give two examples of situations in which both the work and the employee are invisible: 1) when the observer sees only a non-human product but not the work that went into producing it or the people involved in that production, and 2) when the work and the workers have come to be represented to the observers by a set of indicators, usually in the form of statistics, graphs or other forms of reporting mechanisms.

In the case we are examining here, as is the case in many universities worldwide, quantification of academic work has become the norm, for better or worse, and is something that academics live with every day (Marginson & Considine 2000). However, what we have seen outlined in the examples above is another way for both employee and work to become invisible – when tasks are translated from their fleshy form into written communications. Inger notes, in looking at the calendar entry “Write paper for X”, that her ‘bland little calendar entry’ does not capture any of the emotion, the chaos, the politics and power structures, the messiness, the human elements, and the work that she had already done and would still need to do, in collaboration with her various technologies, in order to fulfil the demand being made of her in the entry. Likewise, the email that Inger received from her superior, requesting that the briefing paper be written, undoubtedly made what may have been a highly charged debate almost entirely opaque to Inger by translating it into a similarly bland, unemotional written request via email. The backstory, the history that led to the sending of that email, is black-boxed so that both the people who were involved and the intellectual, emotional and physical work that they performed is now invisible.

Conclusion

This study has explored the notion of the human-technology hybrid, seeking to understand how ‘smart’ technologies are enmeshed with humans in their fleshier forms to assemble different identities from moment to moment. The key move here was to be acutely aware that an actant can be anything that *does something*, or has some effect in the actor-network – and so, the researcher must be ever-vigilant. As Humphries and Smith (2014) have suggested, it is critical for the researcher to ask a lot of questions — both of the human actants in the actor-network, and when the actants are not human, of themselves — why would that actant be behaving that way? What is its history? What are the power relations working for and against it? What influences that actant? These questions are admittedly easier to answer if your human shadowee is self-reflective and a good communicator, as Inger is often described.

This paper argues that technology, as could perhaps be expected, is a crucial actant in the DRT actor-networks and in Inger’s actor-networks. In this study, it was not just helping maintain her identity as pro-technology (Inger as Tech-Head), it was also actually doing a lot of work for her that was being black-boxed; work that was critical in allowing her to simultaneously manage multiple identities. This is important because most of this technology was Inger’s, that she had paid for from her own pocket. There are two implications for universities in this: firstly, it indicates that the university may be failing to acknowledge the valuable contribution that something like a smartphone makes to the success of a university middle manager. Secondly, this could lead to an enormous loss of institutional knowledge should an employee such as Inger choose to leave without doing a thorough handover, or if something tragic were to happen to an employee before they had this opportunity. If Inger leaves this university, all of the DRT actor-networks that have been built up and mingled and overlapped with the Inger actor-networks will be disrupted, leading to an extensive period of instability for the institution. Because Inger and the various discussed technologies worked together to maintain the invisibility of the work being done in enacting the DRT actor-networks, it would be difficult if not impossible for the casual observer to know what the content and practices of that work included, particularly as Inger’s days were so fragmented that she rarely spent more than an hour in one place, and even during that time was managing multiple actor-networks and identities.

Finally, we offer something of a counterpoint to the argument of the paper — a risky move, but one that we feel is important, and not unprecedented. As we demonstrated throughout the paper, Inger contributes an enormous amount of invisible work to maintaining the Fleshy-DRT and Online-DRT actor-networks — the ones she personally gives ontological status to. Her tech-savvy approach very much helps to maintain the invisibility of much of her daily work from her superiors. She is able to appear like the proverbial duck — she glides along the surface, making her job look effortless, making herself appear endlessly capable, a fixer, someone who can smile serenely and say, ‘It’s handled’, when in fact beneath the surface of the water she is paddling like crazy. So we can also conclude that it is not always advantageous for invisible work to be made visible. This is in concurrence with Star and Strauss (1999: 10), who point out that:

On the one hand, visibility can mean legitimacy; rescue from obscurity or other aspects of exploitation. On the other, visibility can create reification of work, opportunities for surveillance, or come to increase group communication and process burdens.

And so we end on a cautious note. Universities would be well served to be aware of the work that technology is contributing to the maintenance of the various overlapping and complex actor-networks that make up their higher education institution. That said, it is not always in the best interest of the human actants involved, when we open the black boxes and peer inside.

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