4. Making and Breaking: Electronic waste recycling as methodology

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Abstract

This chapter proposes a practice-based methodology to investigate the materiality of electronic waste (e-waste), which formed the basis of the art-science research project Bodies of Planned Obsolescence: digital performance and the global politics of electronic waste. Building on anthropologist Tim Ingold's concept of 'making', a widened understanding of the term 'digital performance' informed shared practical activities of a group of scientists, cultural theorists, and artists. During two field-research workshops in Hong Kong and Lagos, Nigeria, researchers participated in e-waste recycling in a factory and on a dump site. Thus, in this form of practice-based research, the practical aspect of the research process does not concern the production of artworks, but instead involves shared participation in labour with materials. A process of shared reflection on this practical work may lead to outcomes in the form of new research avenues within the various disciplines of the participating researchers.

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electronic waste, e-waste, digital performance, anthropology, recycling, peripherals, toxicology, cyborg, practice-based research, art-science

Introduction

A substantial part of discarded electronic devices in Europe and the United States are exported to developing countries, where they are eventually recycled through environmentally harmful methods or dumped in unprotected areas, causing severe environmental damage accompanied by a range of socio-cultural problems. Despite this, public debate on digital technologies in post-industrial countries has been primarily focused on the economic and social benefits of technological innovation. Digital performance arts practices have largely been complicit in this narrative: On the one hand, their primary interest has been in the exploration and showcasing of state of the art innovations (e.g. the work of Stelarc and Neil Harbisson). On the other, critical practices in the field have been restricted to the politics of a western, post-industrial cultural framework (e.g. the work of Eduardo Kac and ORLAN). Digital performance art has rarely engaged with the material and socio-economic aspects of technology in terms of their production, and their 'afterlife' as electronic waste (e-waste).

This chapter will discuss an interdisciplinary approach to the research of e-waste, in terms of its socio-cultural as well as its ecological dimension. Building on a widened understanding of the term digital performance, the focus will be on scientific, cultural studies and artistic engagement with the debris of techno-consumer culture. However, the broader interest of this text goes beyond the specific research project with e-waste that forms the framework of the discussion. This project will also serve as a case study to rethink practice-based research involving researchers from artistic and other disciplinary backgrounds. Whereas concepts of practice-based research or practice-as-research in interdisciplinary endeavours have usually treated the artistic activity itself as the practical component of the research (see for example Nelson, 2013), I will propose a methodological approach where the practical aspect of the research is located in shared participant observation with research-

ers from different disciplines. In this approach, any actual artistic outcomes are primarily understood as a *response* to the (practice-based) research process, rather than constituting the research process in itself.

A research project into electronic waste

Bodies of Planned Obsolescence: Digital performance and the politics of electronic waste was an art-science research networking project, funded by the Arts and Humanities Research Council, UK (Ref: AH/LO1582X/1) and The Royal Central School of Speech and Drama, University of London. It took place during 2014-15. The project used and developed strategies in digital performance art, cultural studies, and science to engage with the political, sociological and ecological issues around electronic waste in countries that export (UK) and import (Nigeria and China) used technology. An international group of artists, cultural theorists and scientists explored the materiality of obsolete and discarded electronic devices in a series of workshops, symposia and exhibitions in Hong Kong, Lagos (Nigeria), and London. Central to the workshops in Nigeria and Hong Kong were two practice-based explorations around the material and social aspects of e-waste recycling. This chapter will draw from the outcomes of these two workshops.

The participants of the project spent several days working at improvised and industrial e-waste recycling facilities in Lagos and Hong Kong, guided by – and alongside – local workers. These shared experiences formed the basis for an exchange between the participants, which in turn informed reflections on research and methodology in their respective fields of research.

An initial incentive for this research project was a broader observation about the representation of e-waste in media and activism in the Global North. From the perspective of Western observers, informal e-waste recycling in West-Africa and the Far East is often perceived solely as a harmful activity

for health and environment. However, local perspectives are more ambiguous. For many recycling workers, who are usually aware of health hazards, the value of the materials in discarded electronics means that recycling is also considered a reliable and substantial source of income in an economic context where often few other viable strategies to make a living are available. The same is the case for the broader questions around export of old computers and other electronics from OECD to non-OECD countries. Whilst the one-way displacement of old devices to West-Africa and other regions eventually generates large quantities of electronic waste, affordable, second-hand consumer technologies are also very much in demand in these countries. Thus, propagating a wholesale ban on the export of obsolete electronics will raise other, complicated questions around the ethics of capitalist modes of exchange and the politics of international development cooperation.

Research methodologies in science and cultural studies have often focused on observing processes and activities from an outsider perspective; the researcher positions her- or himself as an observer who describes and analyses a phenomenon. This approach has also been common in research in the field of e-waste, and may have contributed to the prevalence of rather simplistic representations of the politics of electronic waste in Western popular media. Toxicologists usually visit dump and recycling sites for a very short time interval during which they collect a set of samples for laboratory analysis, whilst taking care not to come into contact with any potentially hazardous material (e.g. Olubanjo, 2015). Similarly, reflections on e-waste in media studies have largely been drawing from the analysis of data sets and reflections on media reports (see e.g. Maxwell and Miller, 2012)

Anthropologist Tim Ingold has critiqued outsider observation-based research methodologies in anthropology and archaeology in his recent book *Making: Anthropology, Archaeology, Art and Architecture* (2013). Suggesting that anthropology should be based on studying '*with* people' and hoping to 'learn *from* them' (2013: 2), Ingold proposes to turn to methodologies in art practice to develop new ways of '*doing* anthropology' (2013: 8). He argues that art history and ethnography have in

common a desire to examine the world through observation of artefacts, performance, and documentations. Instead, art and craft practices to a large extent evolve around studying the world through practical explorations of its materials, forms, and actions. It is this latter approach that Ingold identifies as a potentially fruitful methodological resource for the practice of anthropology and archaeology.

Ingold offers an example of an implementation of such methodology by means of a discussion of how a crafts-based engagement with pre-historic biface handaxes leads to very different perspectives on its possible historical significance than traditional historical studies, which have primarily built on the observation of archaeological artefacts. The specifics of this example are beyond the scope of this chapter, but the general shift from observation to practical exploration of labour processes is central to the methodology of Bodies of Planned Obsolescence. Thus, the project was aimed at extending Ingold's application of arts and crafts-based approaches in anthropology and archaeology to the realm of science and cultural studies of electronic waste, a field of research in which detailed aspects of manual labour skills and sensibility have thus far been little considered. Effectively, Ingold's 'making' was widened to the practices of 'breaking' discarded electronics.

This also means that the project had a significant participatory dimension. The practical workshops were aimed at facilitating knowledge transfer through a shared engagement in specific activities. Here, e-waste workers were not approached as subjects of study, but as experts who guided the project participants in developing a more detailed engagement with materials and their related recycling processes.

Here, it is important to note that the objective of these activities was not to create an illusion that the artists and academic participants would gain first hand knowledge of 'what it is like' to work in e-waste recycling in day to day life. As project participants will undertake these labour activities in

the knowledge that their livelihood is not dependent on it and they can and will return to their comfortable hotels afterward, their experience of the work will hardly be comparable to that of the people they will be working with. Instead, the workshops in Lagos and Hong Kong were aimed at establishing a framework that facilitates the development of research methodologies that are rooted in an awareness of different experiences of physical and intersubjective processes in industrial and informal e-waste recycling.

Digital performance and methodology

Building on Ingold's writing, the workshops were designed around the idea that the researchers from different disciplines would approach their engagement with e-waste following an approach based on artistic practice. However, this was not as straightforward as it might sound. Unlike Ingold's suggestion that artistic practice inherently differs from the outsider observation-based approaches in other disciplines, a common response of artists to a new environment like an e-waste recycling site is to immediately start looking for materials that could be of interest for inclusion in an artwork, whether these materials are physical artefacts or documentary video or sound footage. In this respect, there is actually a clear similarity with the common practice in toxicology research of collecting samples for laboratory analysis, or the analytical approaches common in current engagements with e-waste in media studies. Also here, the process is largely based on positioning oneself as an outsider to the socio-material practices that one engages with.

Indeed, during the workshops in Lagos and Hong Kong it was at times most challenging to convince the participating artists to refrain from focusing their attention on collecting 'aesthetically interesting' electronic components, or generating footage of the environment for video work.

Instead, as I outlined above, the starting point for the workshops was that participating researchers would participate in e-waste recycling work for several days. Possible research outcomes of the workshops would thus primarily lie in the retrospective reflection on – and processing of – researchers' experiences of participation in recycling work.

For the participating artists this information, accompanied by a discussion of the problematics of e-waste as outlined in the introduction of this chapter, was generally considered sufficient. However, some of the other participants, especially the scientists, found it less easy to embark on a research activity with so little focus on concrete outcomes. Many queries were posed during initial meetings: 'May I ask what the objectives of this exercise are?', 'What are the research questions?', 'How will we be able to assess the success of this experiment'. Another issue that was raised was that exposing oneself or other researchers to potential health hazards was considered to be in conflict with the ethics of scientific research. Although by no means life-threatening when confined to a timeframe of merely a few days, participating in manual e-waste recycling is clearly unhealthy, especially on the site we visited in Lagos. Considering the absence of a research framework with clear questions and hypotheses – and methods mapped onto these – the workshops would not easily be deemed acceptable or worthwhile as part of a scientific research project.

It is in these aspects that the workshops' methodology drew from an artistic practice-based approach, more specifically a widened understanding of Steve Dixon's concept of digital performance. Dixon defines digital performance as performance-based work 'where computer technologies play a *key* role, rather than a subsidiary one in content, techniques, aesthetics, or delivery forms' (Dixon, 2007: 3; original emphasis). In this approach, digital technologies are not merely treated as a medium to transmit contents in a work. However, neither do digital devices only act as subject matter. Instead, digital performance is *created with*, whilst it is also *about* digital technolo-

gies. Accordingly, during the workshops, e-waste was not merely treated as a subject of study: broken electronic devices and their associated labour processes were conceptualised as both the *subject* and the *means* of the study. Thus, participants were asked to focus on performing the recycling work as well as they could during the workshop activities, and not worry about its potential meanings and uses in their respective disciplines at this stage, be it science, media studies or digital performance. A process of exchange and reflection on participants' experiences of the activities was conducted after the recycling work, during the remaining workshop days and throughout the year on a shared online platform.

At the same time, the use of the term digital performance as an interdisciplinary methodological concept expands it beyond the way in which it is usually understood. Although Dixon's concept does not exclude it, digital performance in which broken technological devices take centre stage has hardly been considered. Similarly, performance practices involving digital devices that are not primarily perceived as art have to my knowledge not been discussed on those terms. Following the notion of a 'performative turn' that took place in cultural studies since the 1990s (Schechner, 2002), one of the interests of Bodies of Planned Obsolescence is to propose a 'digital performative turn' in the scientific and cultural study of e-waste.

Another consequence of the performance arts dimension of the methodology was a reframing of considerations around health and risk. Whereas a scientific approach to this matter would generally focus on eliminating as much risk for the reseachers as possible, performance art has a long tradition of exploring aspects of bodies and their environments through the deliberate inclusion of a degree of risk for the performer. One only needs to think of some of the by now classic work of Marina Abramovic and Chris Burden, and digital performance work such as Stelarc's *Stomach Sculpture* (a metal structure that could unfold and expand inside the artist's stomach). However, although the kind and degree of risk taken in these artworks would be unthinkable in an institutional

science context[i], it is not the case that among performance artists there is a general culture of gratuitous recklessness around health and well-being. For example, in *Shoot* (1971), Chris Burden asked a friend to shoot him in the arm. This is definitely a dangerous act, but it is important to note that he chose to use a small calibre .22 rifle – not a shotgun – and a friend who could aim well. Rather than a perverse artistic remake of Russian Roulette, this was a precisely prepared action that arguably did just enough physical harm to not pose a life-threatening situation, whilst nevertheless provoking a paradigm-shift in perceptions of bodies and artists' autonomy. It is this kind of approach to the assessment of researchers' health and safety that informed the design of the workshop activities. Thus, the arts practice-based approach to methodology of the workshops also meant that researchers' bodies were conceptualised from a different perspective and as such allowed for activities that – although of possible research interest – would have been off-limits in the frame of health and safety standards and ethics of other disciplines.

Participating in e-waste recycling in Nigeria and Hong Kong

The participant group of the Bodies of Planned Obsolescence workshops in Lagos and Hong Kong consisted of eight people. Cultural theorists Neil Maycroft and Chris Williams (both based in the UK), environmental scientists Janet Chan (Hong Kong) and Kehinde Olubanjo (Nigeria), artists Jelili Atiku (Nigeria), Shu Lea Cheang (France / USA) and myself, and curator Irini Papadimitriou (UK/Greece).

The first workshop took place on a small dump site connected to Alaba Market, a market that covers several square kilometers on the Western outskirts Lagos, a large part of which is dedicated to the trade of mostly used consumer electronics. The main area of the dump site consists of a large open space with piles of all sorts of materials and devices: iron casings of flat screen televisions, computers and household appliances; keyboards and other plastic shells; CDs, DVDs and their

boxes; cables and other peripherals. The site is surrounded by small residential huts, behind which there is a general dumping area with domestic waste and non-recyclable left overs of the e-waste (mainly plastic). Some workers burn cables here to extract copper, whilst cows graze the place for edible left overs in the domestic waste.

After making the necessary arrangements with the so-called Market Association (which include a substantial private ‘donation’ to one of the chairmen in order to 'guarantee our safety’), we met two groups of workers. They were all migrants, mostly from the countryside in the North of Nigeria. We visited two groups of recyclers. The first group worked primarily on the dismantling of larger items such as televisions and microwaves to extract iron and aluminium, whilst the second – working at a small backyard next to the dump – retrieved metal parts and components from circuit boards and open up transformers and fridge pumps to extract copper wire. Initially, our presence at the sites caused much excitement, partly because of the mere presence of 'the white man’, but also because of our request to be mentored in recycling techniques by the workers and subsequently work alongside them for two days. I explained to them that the project particpants tend to only ever encounter consumer electronics as polished black boxes in their everyday lives and that we hope that participating in their way of working with the insides of these devices will offer another perspective. After agreeing with the leaders of the groups on a reasonable compensation for the mentoring and the loss of productivity that would result from our presence at the workplace, we started out.

Spread out over three days, the project participants each engaged and participated in the place and its processes in different ways. The following activities were performed, among others: Harvesting circuit boards for copper (usually coils), aluminium (heat sinks), high capacity transistors, and microchips; opening up transformers with machete blades and hammers to take out copper wire; dismantling flatscreen televisions, computers and hifi devices with hammers and screwdrivers, and

sorting its components according to materials for further harvesting (mainly coils, printed circuit boards, and iron casings). Along the way, we were explained which parts are most valuable and instructed how to extract different components most efficiently and avoid damage of precious components like the high capacity transistors.

Figure 1. Daniël Ploeger, Jelili Atiku, and an unknown boy at an e-waste recycling site at Alaba Market, Lagos, January 2015. Photo: Peter Dammann / Agentur Focus.

In Hong Kong, we visited the e-waste recycling plant of Vannex International Inc., which is one of the main e-waste recyclers in Hong Kong and the only company that is licensed to recycle cathode ray tubes from colour televisions and monitors through chemical processes. Most dismantling work is done manually with the help of pneumatic screw drivers.

After an introduction to the company's activities and an induction to the safety procedures around the work we were going to undertake, each one of us was assigned to a different area on the work floor, dedicated to the disassembly of a particular item: desktop computers, monitors, laptops, as

well as hard disk data removal and stripping PC motherboards of memory chips and CPUs. We rotated after each block of a few hours, so each participant took part in several of these activities over the course of the two days we spent at the factory. We dismantled desktop computers and laptops with pneumatic screwdrivers and separated CPUs, memory cards and other components from PC motherboards. Each individual part of the device was put in a different box: battery, screen, keyboard, hard disk, DVD drive, fan, copper parts, aluminium, rest plastic. Unlike the selective hunt for precious parts at the site in Lagos, the meticulous separation of the different components at Vannex is not driven by assessment of the potential value of the different parts. The assignment was to separate the parts to enable recycling, regardless of their individual monetary value.

Processing observations and experiences

These two workshops were followed by a shared process of exchange and reflection between the participants. Informal group meetings took place as part of the workshop phases in Lagos and Hong Kong during which participants gave short presentations with an outline of their initial reflections and in which they highlighted their key experiences and observations. Several participants also wrote short texts in response to the two workshops, which were shared via email. Another part of the reflective process took place in a shared online document on the website PiratePad, which enables the collaborative creation of a text whilst keeping track of different authors' contributions. Throughout the year the document on this site expanded in a fluid process of interventions and additions by the participants. All this material, in addition to a selection of photographs by Peter Dammann, documenting the work process, formed the basis for the project's third workshop which took place in London in July 2015.

After presenting our ideas of the last months to each other, and revisiting the shared online document we had worked on since the end of the Hong Kong workshop, we identified several thematic

areas of interest. These included, among others, consumer electronics and dust, garbage and cyborgs, and tools as traces of materials and bodies. The different thematic areas were then further explored by small groups of 2-4 participants, resulting in the shared creation of a number of interdisciplinary artefacts and short texts. These materials were subsequently exhibited at Watermans Centre in London, together with the process documents described above.

All participants had been struck by the prominence of dust in the two workshops. Not only in Lagos, but also in the factory in Hong Kong. In Lagos, the ground on which we worked seemed to consist of a mixture of sand and larger and smaller bits of plastic and metal. Over the course of a few hours our clothes and bodies were covered in a fine dust that seemed to consist of non-organic particles in addition to sand. In Hong Kong dust also played a big role. During the work, we were asked to wear dust masks. Although we first thought this was somewhat superfluous, it quickly became clear that inside the usually clean cases of discarded computers large amounts of household dust had piled up. In the exhibition, one of the working groups installed a short text about dust accompanied by an obsolete computer motherboard covered by a large amount of dust. The motherboard's cooling fan switched on and off at random intervals, thus stirring up the dust. Taking the theme of dust as a starting point, two other participants reflected on the concept of the cyborg in the context of waste. Dust on integrated circuits prevents a computer's cooling system from operating adequately. The increased temperature of the circuits will cause the system's performance speed to decrease and ultimately cause system crashes.

In her cyborg manifesto, Donna Haraway defines a cyborg as 'a cybernetic organism, a hybrid of machine and organism' (2000). If we consider that household dust consists for 70-90% of human skin flakes (Clark and Cox, 1973), an ordinary computer can accordingly be considered a cyborg. In the exhibition, this idea was ironically pushed a small step further. Next to references to the publications by Haraway and Clark & Cox, an old vacuum cleaner from the 1970s was presented with a

large amount of household dust from one of the participants inside. Every now and then, it switched on. Was this also a cyborg?

At the start of Bodies of Planned Obsolescence, the idea had been to send back a large amount of European e-waste from Nigeria and use this as material to work with for the final exhibition. However, during the workshops in Lagos and Hong Kong, the interest quickly shifted. The e-waste we worked with was largely familiar: we had used devices similar to the ones we were now dismantling at home ourselves a few years before. Differently, the tools and methods that were used to perform the work seemed much more closely tied to the specific social and geographical context we were operating in. In Lagos, the tools included expired machetes that originated from farms, as well as butchers in the streets next to the dump. In Hong Kong, the workspace was equipped exclusively with Chinese industrial tools. The use of different tools also significantly determined the soundscape of the working environments. Hence, instead of working with reimported e-waste, participants displayed a selection of recycling tools from Hong Kong and Lagos, accompanied by sound recordings from both sites.

Some outcomes

The exhibition of Bodies of Planned Obsolescence was conceived as a way to process participants' reflections and experiences of the practical workshops in a way that would facilitate a combination and integration of both practical and theoretical (text-based) responses. Notably, the exhibition was therefore not understood in the first place as an art exhibition, but as a way to synthesise and present the project's research process.

The collaborative process throughout the project, which culminated in the exhibition at Watermans, functioned as an interdisciplinary basis for the individual participants of the project to rethink or

redo aspects of their research within their own discipline. I will conclude this chapter with three early examples of ways in which the project has informed the direction of work in different disciplines:

1. Environmental science

In previous research, participant Kehinde Olubanjo (2015) had investigated the copper and lead content of e-waste collected at a market in Ibadan, Nigeria. In the study, discarded electronic devices were shredded into small particles, which were subsequently analysed in a laboratory to quantify their copper and lead contents. The purpose of this research was to determine informal e-waste recycling workers' exposure to toxic substances. As described above, during the practical workshops of the project, the role of dust on recycling sites became prominent. Building on his experience during the recycling work in Lagos, Kehinde realised that exposure through dust is an important factor in the health impact of informal e-waste recycling. Accordingly, he conceived a future research project into the toxicity of dust at informal recycling sites in Lagos and consider different ways of workers' exposure to this.

2. Cultural Studies of Technology

Research and discourses engaging with e-waste recycling are generally focused on the computing units themselves and the larger items that are connected to it (desktop cases, monitors, laptops). Drawing from his experiences during the project workshops, participant Neil Maycroft (2015) has initiated research into discourses around e-waste and obsolescence in relation to the role of so-called peripherals: cables, adapters, mice, external modems, etc. Despite the claims of industrial recyclers to achieve an almost 100% recycling rate, practical involvement in day to day recycling activity in Hong Kong showed that most of the smaller peripheral items are often little considered and

do not seem to occur often on the work floor. Data on peripheral recycling rates is lacking, but power adapters, cables, mice and other smaller items were not thematised in any of the work introductions and inductions we attended. Indeed, peripherals often seem to stay behind in people's homes, long after they have discarded the electronic devices they belonged to. In other words, peripherals are also peripheral to e-waste recycling processes.

3. Digital performance art

Building on the project exhibition, I further reflected on the concept of the cyborg in relation to e-waste. I developed the following performance:

Retired Cybernetic Organism #2 (2015)

I draw a few drops of my blood and install these on an obsolete Intel Pentium III processor, collected from the Vannex e-waste recycling plant in Hong Kong.
The CPU is powered up to its maximum permissible operating voltage, 2.0V, but it is not clocked.
It stays idle and doesn't perform any computations, but it heats up, endangering its circuits.
For a short time, the heat of the chip results in the liquid of my gradually dying blood being vaporised into the room.
At the same time, the vaporization also acts as a heat sink which cools down the chip.
This, in turn, limits the dissemination of the liquid.

In his book *On Garbage* (2005), John Scanlan proposes a concept of garbage that goes beyond a literal concern with physical material. He discusses garbage as a metaphor, but also the notion of a garbage of knowledge. Discussing Kant's Critique of Pure Reason Scanlan draws attention to the vast amount of Kant's notes which have been preserved. Whilst of great importance in the develop-

ment of the work, they were not included in the book itself. The production of knowledge is a process of creating garbage: discarding those thoughts and ideas that turn out not to fit in or are not consistent with the paradigm. I propose to extend this notion of a garbage of knowledge to the realm of concepts and imagination: that which is consistent with a concept, but has been rejected from common imagination.

In this context, the 'garbage cyborg' of *Retired Cybernetic Organism #2* is concerned with two understandings of garbage. Firstly, since it is a combination of organic material and e-waste it involves garbage in the material sense. Secondly, it also engages the garbage of the concept of the cyborg. Whilst it is consistent with Haraway's definition I mentioned earlier, this is a very different cyborg from the usual popular cultural version which tends to involve a human body with hi-tech prostheses to extend its power or durability (cf. Robocop, the Terminator or, more recently, *Ex Machina'*s (2015) Alva). My low-tech, non-humanoid cyborg, is conceived to highlight the materialness and inevitable becoming-waste of technology, rather than feature the utilitarian - or dystopian - potential of the application of technological innovations. Instead of a human body with agency that is extended with state-of-the-art technology, we are now considering a long-obsolete machine component – arguably a piece of waste – extended with agency-less parts taken from a human body.

Conclusion

The art-science research project Bodies of Planned Obsolescence: digital performance and the global politics of electronic waste followed a practice-based methodology to investigate the materiality of e-waste. Building on Tim Ingold's concept of 'making', an art-practice based approach based on a widened understanding of the term 'digital performance' was applied to two field-re-

search workshops where researchers participated in e-waste recycling. In this approach, the practical aspect of the collaborative research process did not concern the production of artworks, but instead it involved shared participation in e-waste recycling work. The use of an art practice-based methodology were reflected in the project mainly in two ways. Firstly, it enabled the project to develop in an exploratory manner, without clear, pre-defined research questions and hypotheses as is customary in more conventional research methodologies in science and cultural studies. Secondly, the grounding of the project's methodology in an artistic practice approach meant that researchers could use their bodies in ways that would often not be permissible in institutional scientific practices. Instead of avoiding risk for the researcher's body as a primary principle, the project drew from performance art practices where the inclusion of a degree of risk may be negotiated as part of the concept of an artwork.

The implementation of this interdisciplinary methodology, accompanied by a process of shared reflection, informed ideas for new research avenues within the various disciplines of the participating researchers: toxicology, cultural studies of technology and digital performance. These follow-on projects by individual participants are currently still in an exploratory stage, but the fact that the innovative directions of this new research were catalysed by the researchers' participation in the practice-based workshops of Bodies of Planned Obsolescence suggests that the methodology outlined in this chapter deserves further exploration. The time-span of the current project was limited (a total of merely five practical recycling workshop days) and at the onset of the project the majority of participants did not have an expectation of the potential value of practice-based inquiry to specific aspects of their research. Future explorations of this methodology would benefit from a series of workshops that take place over a longer timeframe, as well as suggestions from different members of the participant group with regards to possible workshop activities (e.g. determine which aspects of a labour process will be participated in), based on their discipline-specific perspectives on the subject matter of the research.

Notes

[i] There is a tradition of scientists who experiment on their own bodies in order to circumvent long approval times for experiments or reduce experimental costs. However, these strategies are generally approached with scepticism and caution in the wider scientific community.

References

Badmington, Neil (2000) *Posthumanism.* Houndmills, Basingstoke, Hampshire: Palgrave.

Clark, R. P., and Cox, R. N. (1973) 'The Generation of Aerosols from the Human Body', pp. 413-426 in J. F. P. Hers and K. C. Winkler (eds) *Airborne Transmission and Airborne Infection.* Utrecht: Oosthoek Pub.

Dixon, Steve and Smith, Barry (2007) *Digital performance*. Cambridge, Mass.: MIT Press.

Ingold, Tim (2013) *Making: Anthropology, Archaeology, Arts and Architecture*. London: Routledge.

Lewis, J. Lowell (2013) *The Anthropology of Cultural Performance*. London: Palgrave Macmillan.

Maxwell, Richard and Miller, Toby (2012) *Greening the media*. New York: Oxford University Press.

Maycroft, Neil (2015) *Obsolete peripherals: the ghost of the machine?* in 'PLATE Conference', 17 - 19 June 2015, Nottingham Trent University.

Nelson, Robin, ed. (2013) *Practice as Research in the Arts: Principles, Protocols, Pedagogies, Resistances.* Houndmills, Basingstoke, Hampshire: Palgrave

Olubanjo, Kehinde, Osibanjo, Oladele, and Chidi, Innocent Nnorom (2015) 'Evaluation of Pb and Cu contents of selected component parts of waste personal computers', *Journal of Applied*

Sciences and Environmental Management 19(3): 470.

Ploeger, Daniël (2015) *Retired Cybernetic Organism #2,* performance.

Scanlan, John (2005) *On garbage*. London: Reaktion.

Schechner, Richard (2002) *Performance studies*. London: Routledge.