

RESEARCH

# Electronic Life Histories: At Home with E-waste Waste Materialities and Meaning

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The interdisciplinary Electronic Life Histories Project integrates behavioral archaeology, engineering, anthropology, art, material culture, and science and technology studies to employ a life history model, community-based research and creative engagement to address the making of electronic waste. Focused in the Greater Lafayette area of Indiana, which is home to a major university, this project examines the entanglements among people, electronics and waste-making. Specifically, this paper focuses on a significant interstitial stage between reuse and discard. We consider the stories and meanings affixed to electronic objects once they have entered people's homes, and the complex lives they have before they are discarded, reused, or repurposed. We find 'closet fill' or junk drawers of electronic devices, bits, bytes and peripherals are often unintentional collections that are situationally valued through a constellation of factors that include emotional attachments, technological obsolescence, imagined use-value, as well as discrepancies between perceived value and market value. While the problem of closet fill has been discussed by scholars, how electronics enter this interstitial stage, why they remain and what motivates movement out of this part of the life history of objects have not been closely examined. We suggest a life history approach can make these interstitial phases visible in a way that illuminates the key factors in keeping electronics versus discarding. As opposed to descriptions of waste as disorderly, abject, or disgusting, our work shows that objects at the interstices of wasting practices embody, represent, and express many meanings to participants socially, spatially, and structurally.

**Keywords:** e-waste; material culture; waste studies; interdisciplinary methods; autoethnography; object lessons; life history; behavioral archaeology; affect

## Introduction

I had always been a music lover, but this iPod allowed me to steal away, to my own musical world full of emotion and soul, and it was awesome.... But eventually, because of peer pressure and practicality [to use a new iPhone], my nano ended up on my bedroom bookshelf, where it sits to this day, the battery long dead and its musical contents ten years out of date. I keep my iPod to remember my first taste of private musical freedom; the ability to experience a piece of music with no one but myself and relish in it.

Looking towards the future, I'll probably keep this iPod for years and years as a decoration. Maybe show it to my kids, so they can laugh. It'll be a meaningful keepsake from the early 2000s; a milestone of what cutting edge consumer technology measured up to years in the past. It'll be my own little piece of human history....

Junk drawer narrative audio recording, Fall 2017<sup>1</sup>

Personal attachments to electronic objects can be so strong, that mass consumer objects are prevented from fully becoming e-waste long after they have become obsolete and replaced by newer devices. These affective associations can be so enduring that owners even anticipate sharing devices with future generations. We open this paper with the excerpt above because it highlights a key question underlying our discussion: How do individuals categorize and treat electronic objects at a phase in their life history that is the least understood – the moment when they move from use to storage to discard? We found this moment particularly potent in the life cycle of electronic objects precisely because it fails to fit into one categorization. As this student's response suggests, individuals consider electronic objects in a multitude of ways – from undesirable trash to a 'milestone' and 'meaningful keepsake.' In this paper, we take these reflections as incidences of a larger phenomenon, which we label the 'junk drawer' at the household level. The junk drawer represents a very particular phenomenon of household material culture where electronics are part of larger collections which hover at the stage between storage and discard. In the following text, we consider stories and meanings affixed to electronic objects once they have entered people's homes,

and the complex lives they have before they are discarded, reused, or repurposed, in order to better understand the life cycle of electronics. Through this lens we also seek to understand the ways in which stored electronics are influencing not only socio-environmental conditions, but the ways in which we relate to each other and more-than-human worlds.

In contrast to the above example, much scholarship on electronic waste (e-waste) emphasizes local to global flows and life cycles of waste by making visible uneven landscapes of consumption and discard. The images and descriptions of ‘electronic graveyards’ in West Africa<sup>2</sup> or ‘gadget trash’ in China<sup>3</sup> produced by these studies dramatically reveal the lived consequences of planned obsolescence and consumer choices on a massive scale. By 2010 an estimated 3 billion units of consumer electronics in the United States had reached the end of their use-life or been replaced with a newer model. This equals about 400 million units discarded per year (Gabrys 2013; IAER 2003). In 2016, approximately 20 kg of e-waste per inhabitant was produced (Baldé et al. 2017: 64). Such spectacular accumulations provide critical insights on a number of issues related to the detritus of the electronic age, although on a scale that challenges human comprehension (**Figure 1**). These issues include the distribution of waste and its links to consumer attitudes, private sector trends, as well as the failures of conventions, such as The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal to ameliorate the unjust effects of global relationships between consumption and discard.

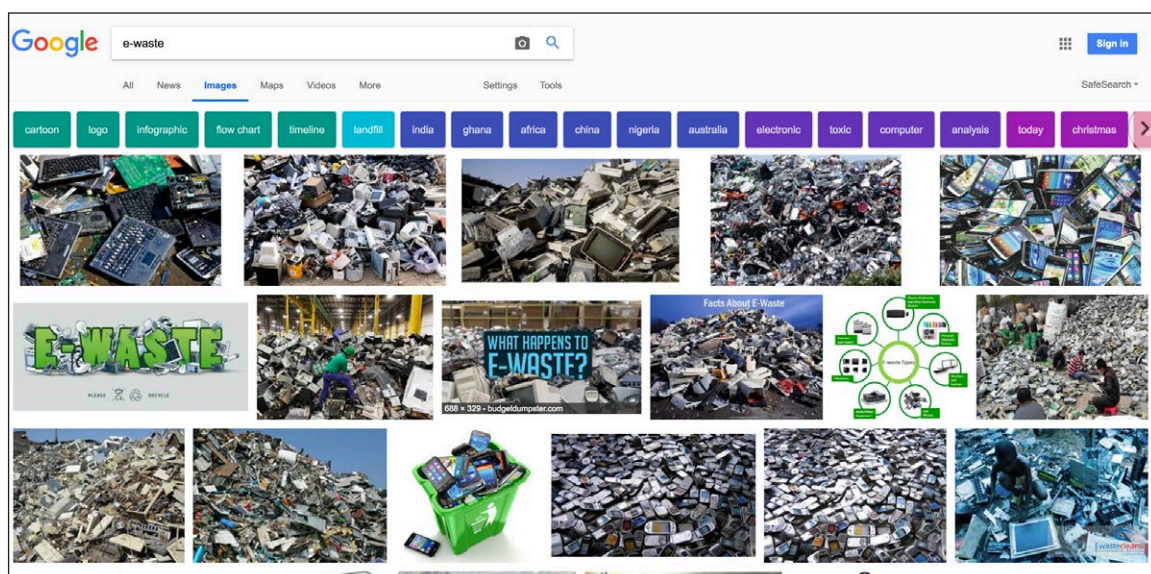
The concentrated vast e-waste dumps outside the political borders of the United States, which have permeated the pictured imaginary of e-waste, are also connected to an unknown number of micro-sites distributed in households across the national landscape that go largely unnoticed despite their proximity.<sup>4</sup> Amongst the literature on the rapidly unfolding electronic waste crisis and ‘mass wasting’ practices (Reno 2016), less attention has been paid to the micro-practices that formulate the performative,

affective and embodied experiences of electronic objects and e-waste in everyday lives<sup>4</sup>. Research in different fields and with different objectives tells us that hundreds of millions of unused electronic devices are in storage in American homes (e.g., Saphores et al. 2009; Arnold et al. 2012). But, this phenomenon has so far been completely unaccounted for in Life Cycle Analysis models used to inform decision making in manufacturing, recycling, and waste management.

This is where the Electronic Life Histories Project intervenes and hones in on a significant interstitial stage between use and discard; a stage during which value is negotiated and troubled. We argue that boxes in attics, basements and garages or junk drawers in kitchens, living rooms and offices that contain electronic devices, bits, bytes and peripherals are often unintentional collections that represent material sites of hope, intention, memory and concern—matter in place, but out of use (see Hetherington 2004). The decisions made by many of our participants about the discard or storage of electronic objects are similar to the student response above. What we have found is that at the household scale most reflections about electronic objects evoked senses of identification, joy and social connection – a stark contrast to the affective and sensorial dimensions of waste we see at a more macro-scale, such as disgust, abjection and disdain (e.g., Douglas 2002). At the same time, classroom discussions, conversations with community members and informants have also revealed the junk drawer as a physical manifestation of an inner unresolved conflict. Where the desire to dispose of unwanted electronic objects meets an inability to do so, a junk drawer is often born.<sup>5</sup> These insights have prompted us to try to understand and chart what an e-waste landscape looks like at the household scale.

### *Electronic Life Histories Project*

The specific questions explored in this paper emerged from a larger collaborative project that began in 2015. Focused in the Greater Lafayette area of Indiana, the Electronic



**Figure 1: Google search of the term ‘e-waste.’** This screenshot depicts the front page of the image results and related categories for the keyword ‘e-waste’ conducted on February 26, 2018 by Author.

Life Histories Project (ELHP) is an interdisciplinary team at Purdue University investigating peoples' quotidian engagements with e-waste or what Braidotti (2011) calls 'the ordinary micro-practices of everyday life.' Following the work of Schiffer and colleagues (Schiffer 2010; Skibo and Shiffer 2008), we employed the Life History concept as used in behavioral archaeology to identify and investigate a crucial but overlooked stage in the life of electronic devices, i.e., the long-term storage of this material in the home. Unlike other approaches in archaeology, behavioral archaeology avoids the distinction between past and present in its investigation of technological and social change (Rathje 1979). As a result, behavioral archaeology scholars have demonstrated the benefit of applying behavioral archaeology concepts and methods to achieve a better understanding of contemporary behavior and its material traces as it relates to the consumption and discard of technology (Schiffer 2011; Rathje 2001).

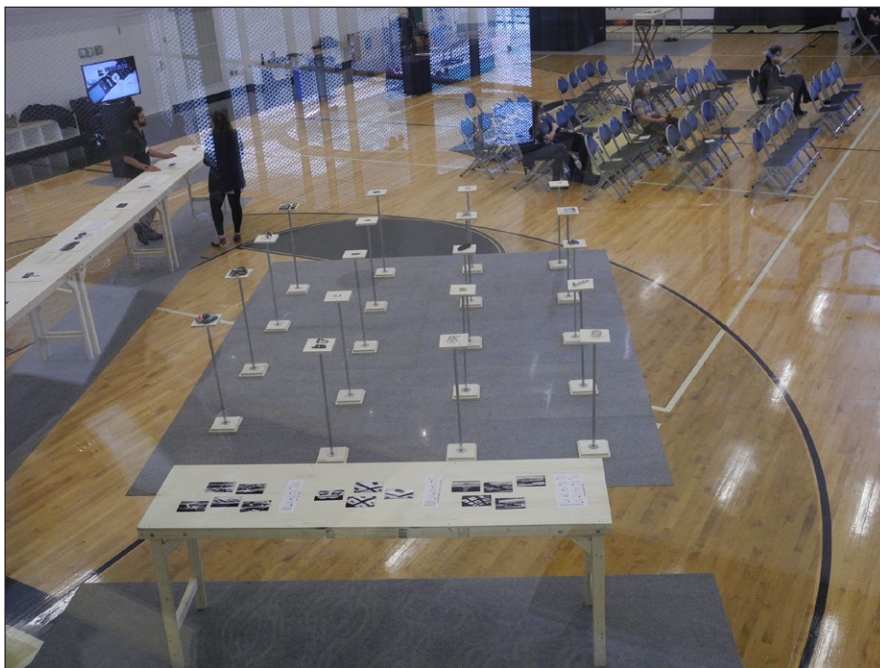
Using this interdisciplinary approach, we formulated a research design to engage with the category of waste, especially as it relates to electronic objects: when, where, how, and for what reason do electronics become or 'unbecome' waste. We asked: What meanings do people ascribe to electronic objects? How, in what way and in what contexts do electronic objects become waste? In this sense, we engage with questions of how are people 'saving waste'? In order to do so, we carried out qualitative research that merged tenets from life history analyses with arts-based and ethnographic methodologies to elicit the individual stories of those objects. From our interdisciplinary approach, we anticipated that the life histories would be embedded in complex affective, processual, and institutional decision-making that animates various phases of electronic lives. In this way, we were interested in identifying the diverse

meanings, values, and distinctions people affixed to these everyday objects and broad patterns associated with this emergent phenomenon.

Overall ELHP had two separate but interrelated goals in its pilot phase. The first, was to investigate the theoretical possibilities of the intersection among art, anthropology, behavioral archaeology, and materiality studies to better understand the motivations, practices, behaviors, and meanings connected to electronic life histories. We started from the new materiality studies assumption that people, technologies, and places express agentic capacities, and thus shape everyday practices in different socio-cultural and political economic worlds (Bennett and Joyce 2013; Miller 2005). The second goal was to advance the methodology used to study e-waste. We created an interdisciplinary multi-modal research design that included ethnography, spatial mapping, art-based practices, and community exhibits (**Figure 2**). Together, we anticipated that these activities would curate, collect, map, analyze, and communicate the lives of electronic objects as well as the production and meaning behind e-waste. In this sense 'performing' e-waste, for the team, was an 'ethical and political act' that resulted in methods meant to provoke and question e-waste in the area which we called home (Alaimo 2016: 5).

### Household Junk Drawers —Between Waste and Collection

The Junk Drawer Project brings together objects, images and narratives, exploring forms of value and categorical distinctions in the context of electronic life histories and e-waste formation. It emerged early on as a key part of meeting our methodological, theoretical, pedagogical, and public engagement goals. The term 'junk drawer' quickly conjures a phenomenon common to many households;



**Figure 2: Electronic Life Histories Project Community Exhibit and Symposium.** In the Spring of 2016 the interdisciplinary ELHP team organized an exhibition, symposium and day long series of events—including a workshop, music performance and video—on the topic of e-waste. Pictured here is an installation of a deconstructed cell phone spatially arranged by life cycle stage from extraction to decay with explanatory material on the table. (Photo: Author)

it also functions as a metaphor for those unintended collections of things otherwise out of place that are symptomatic of a consumer society (**Figure 3**). The familiarity of junk drawers, which we have found often contain electronic devices, can act as an effective springboard for reflecting on the life histories of electronics and the less familiar concept of e-waste. Drawing on Rathje's studies (1992; 2001) of modern waste to inform current social and technological practices, we used the Junk Drawer Project to learn what consumers know about e-waste generally, and to examine the concept of 'waste' as it applies to unused electronics stored in homes.

The deposition of electronic devices in junk drawers, closets, attics, and garages is the result of cultural processes. One of the most widely used aspects of the behavioral archaeology program has been the study of such site formation processes (Schiffer 1996). When conducting archaeological fieldwork how much of what one finds, and its spatial arrangement, is the product of natural processes versus human action? The Junk Drawer Project provides an opportunity to use a behavioral archaeological approach to investigate the various kinds of behaviors and attitudes that create these contexts of storage in the home to further enhance our understanding of meanings, behaviors, and attitudes embodied in junk drawer and storage practices.

We considered the junk drawer space as a critical site that reflects much about individual and household collection practices and relationships to electronic objects. For example, in their anthropological study of household material and visual culture in LA, Arnold et al. (2012) write:

Across the U.S., every home on every block is its own small, informal museum with a unique set of material culture filtered from a wider spectrum of available art, furnishings, and technologies. Americans display many of their most cherished possessions in the 'public' rooms of houses because they assist in telling family histories and expressing what is most important about family members (135).

Similarly, Hurdley's (2006) 21<sup>st</sup> century mantelpiece narratives add to empirical research that demonstrates how 'apparently private experiences of the self are manifested by means of display objects and domestic artefacts' (717). If 'personal autobiography and public cultural values' are apparent in the material culture found in domestic spaces (719), what does it mean to be at home with e-waste?

In contrast to mantels, the junk drawer space (or other related segregating spaces including the attic box, garage shelf, basement clutter and closet fill) hidden either in plain sight or in less public areas of the house represents a method to prevent objects from becoming waste through their collection and curation process. In fact, the internet abounds with advice on how to make a junk drawer 'useful' by sorting, containing, ordering and arranging—to find your best self even in your junk drawer.<sup>6</sup> By focusing on the electronic objects relegated to storage and their agentive capacities, we find an opportunity to understand the practices and meanings associated with such objects in general and e-waste in particular as relationships that '... constitute[s] the self in the habits and embodied practices



**Figure 3: 'Junk drawer' Example (2017).** This photo submitted as part of student response depicts a typical collection of electronics stored out of the main household space (the basement in this case). The Wii (indicated by circle added by instructor) was the focus of an electronic life history which is highlighted in the 'technology and social space' section below. (Photo included with permission of photographer)

through how we decide what is connected to us and what isn't' (Hawkins 2006: 4).

Junk drawers reveal not only domestic *spatial* ordering practices in making or unmaking waste, but also exhibit *temporal* properties important to the study of e-waste. Jussi Parikka's (2011) concept of 'medianatures' calls for attention to the materiality of electronic media in a way that makes more visible the connections between nature, humans and technology across differing temporalities that capture the processes and relations of e-waste. He explains:

...focusing on the materiality of components and waste of electronic media suggests extremely long and uneven networks of the spatial distribution – and also labour distribution – of media cultures, as well as a completely different temporality to that which is usually marketed as an aspect of digital technologies (4).

Drawing on the work of Jennifer Gabrys (2011), Parikka observes that this is a contrast between 'speed, efficiency and progress' in the realm of production and consumption, and the 'time of dust and soil' in the realm of resource extraction and decomposition (4). Our approach, though, complicates this perspective. Electronics appear to move in and out of categories of waste—suspended between temporalities—as they intersect with human-object life histories.

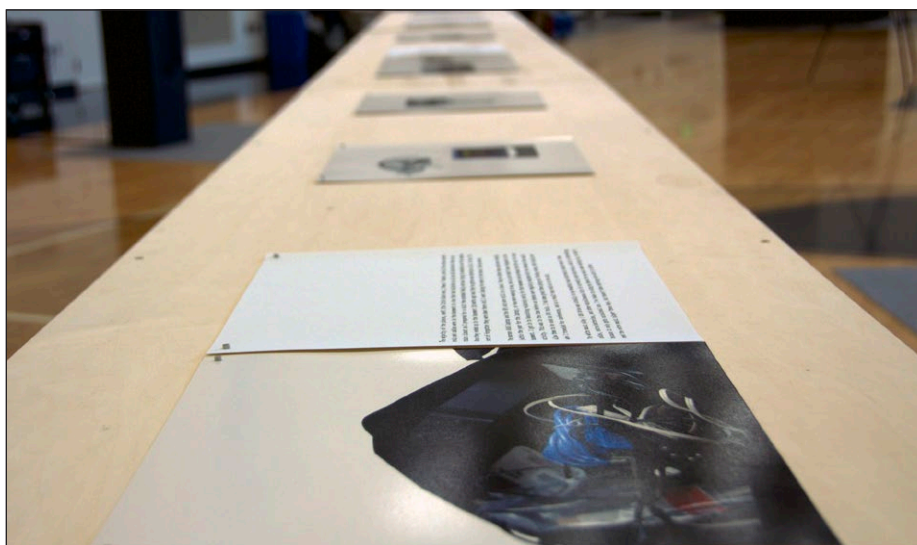
### Teaching the Junk Drawer Project—Implementation and Iteration

Originally piloted in a small, upper-division undergraduate course on environment and culture in the spring semester of 2015, the teaching version of the Junk Drawer Project draws on material culture methods of inquiry and systematic photo-documentation on the one hand, while providing space for memory work, affective connection and reflexivity on the other.<sup>7</sup> As an activity, it asks its participants to visually document a stored collection of 'junk' and then reflexively consider their relationship to

one electronic object found within it. When structured as an individual activity with a public component or group discussion, the project can couple personal reflection with a wider shared social and/or generational understanding of the complicated relationships between electronic objects in our everyday lives and e-waste streams in the world today.

We have carried out the project primarily in classroom spaces with 15–80 undergraduate students as part of courses that include topics related to technology, society and the environment. However, the set of activities can be used or expanded to any context. For example, in preparation for a symposium on electronic life histories held at Purdue during Earth Week the spring of 2016, key members of the ELHP team completed the junk drawer exercise themselves. The photographs of our – the team's – electronic objects and related stories were displayed alongside other exhibits, films, and performative spaces during the symposium (**Figure 4**).

Since the pilot and the symposium, the classroom version has been implemented four more times (in two graduate seminars and two undergraduate courses). Currently, two more implementations at the undergraduate level are planned. With each iteration, we have worked to revise and refine the slate of material culture questions and to experiment with visual and narrative outcomes. Participating students have chosen a range of items to consider: cell phones, iPods, video cameras, e-readers, personal DVD players, video game consoles, USB drives, Walkmans, cameras and laptops. Using the information that students generate through answering questions, they then communicate their object stories and findings through art, narrative and text: including but not limited to audio, sound, film, photography, posters, or other methods of reporting out findings and experiences. Thus, another important goal of the larger project is to explore aesthetic and engagement possibilities for public presentation of the outcomes as a way to further critical conversation about e-waste.



**Figure 4: Display of ELHP Team Junk Drawer Stories.** For an Earth Week event a photo/narrative series was created and displayed. The series paired junk drawer images with narratives about specific objects found within them. (Photo: Author)

### ***Affective Properties and Proximity***

Grappling with shifting value in its many connotations is central to understanding e-waste at home. Two dimensions of value shift that student engagement with the Junk Drawer Project have made salient are affective properties and proximity (in terms of space, emotion and identity). In *Waste (Object Lessons)*, Brian Thill (2015) finds that death is a moment that can cause the value of objects gathered over a lifetime to be suddenly reconsidered because, ‘...death expels them into a new and untethered life, where new and harsh scales of value are laid upon them and judgements rendered in a swift and merciless order’ (99). Thill’s tethering metaphor extends the notion of personhood to include the constellations of objects we own. In a similar vein, Sara Ahmed (2010) develops the concept of ‘sticky’ to theorize the affective dimensions connecting people and things, also considering that materials and materiality constitute different formulations of personhood and identity: ‘Affect is what sticks, or what sustains or preserves the connection between ideas, values and objects’ (29). Through the concept of ‘sticky’ objects, Ahmed offers an explanation as to why some things are tethered more strongly than others to our bodies, our homes and our emotions. Specifically, she uses the term affective value to describe the variable emotional attachment that adheres to people and things, and to trace the social nature of these relations – relations which are assumed to have strong influences on our interpersonal relations and worldviews.

The Junk Drawer Project illuminates ‘sticky’ objects at work. The project shows that electronic objects –even those that are obsolete or no longer functional—are tethered to us in our ‘near sphere’ (Ahmed 2010 discussing Husserl: 31–32) through *both* positive affective value and negative affective value. Electronics that serve as keepsakes and/or markers of identity seem to exhibit the qualities of what Ahmed calls ‘happy objects’ – objects to which good feelings have become stuck through habits and associations. In contrast, negative affect can stick to electronics categorized as waste, resulting in objects of concern (e.g. about their ecological impact), or anger (e.g. about the cost or inconvenience of responsible disposal or recycling) or frustration about the loss of exchange value that becomes apparent once an owner is faced with repair or limited options for resale/reuse.

Interesting for our work on electronic life histories, is that these very different affective values, even opposing ones, can all result in keeping unused electronics in place in homes. In contrast, in those cases where obsolete electronics (no use value, no exchange value) are seen as ‘neutral’ or when they do not meet expectations (e.g. poor performance and/or negative memories), they then become ‘matter out of place’ (Douglas 2002), disrupting notions of cleanliness and organization.

In some instances, the very same object that might lack emotional connection or significance for one person, might serve to link person, affect and memory in highly meaningful ways for another—remaining tethered to their owner, even when the object in question was obsolete and its intended functions difficult to access. Our study shows that the intimate engagement with electronic objects and storage reflect a hesitation for removal because of ties to expressions of self, home and relationships. Moreover, the objects operate as boundary transgressors that serve as mnemonic and physical bridges to important transitional moments in their owners’ lives.

Through an examination of the written responses and classroom discussions as well as visual and oral narratives generated, we employed grounded theory techniques to identify an emerging set of descriptive codes, what we label themes here, that reveal the meanings and values peoples associate with these objects (Saldaña, 2012). These findings shed light on how the relationships people have with these objects structures what happens in the time and space between consumption and disposal. **Table 1** below provides an overview of these themes and example technologies discussed by respondents. In the following section of the paper, we will focus on these themes of object neutrality, functional value, consumerism and obsolescence, technological archives of the self, performing kinship, and, technology and social space—in more detail, choosing examples from three different upper division undergraduate courses over the period of 2015–2017.

### ***Object Neutrality and Functional Value***

There were several responses that noted the neutrality or lack of agency of an object because of its ubiquity and/or disposability. **Figure 5** (below) provides an example of such an observation paired with an image of the object the student responded to:



Ipods [sic] are pretty neutral objects that have popularity spanning beyond that which I identify with. It has no value and I will be disposing of it. Due to the millions of people that bought this model, one could argue towards the lack of human agency. Perhaps we are simply controlled by ads.

**Figure 5: iPod as neutral object.** Photo and text submitted by student as part of junk drawer project assignment.

**Table 1: Junk Drawer Project: Emerging Discourses and Themes.** The table provides an overview of themes that have repeatedly emerged through responses to the junk drawer project activity. The explanation column is a summary explanation of that theme and the technologies column provides examples of electronics that have been connected to each theme.

Junk Drawers Project: Emerging Discourses and Categories		
THEME	EXPLANATION	TECHNOLOGIES
<b>Object Neutrality</b>	Discussions demonstrate no significant affective connection to object and reject the existence of any individual characteristics either imbued through use or context. Ubiquity and mass production receive attention.	iPod, GoPro
<b>Functional Value</b>	Responses that focus overwhelmingly on the actions performed with the object, capabilities and limitations of the object.	USB external memory drive, GPS, iPod
<b>Consumerism and Obsolescence</b>	Discussions highlighted the ephemerality of devices, as respondents looked back, and saw them as part of moments in their life that had already passed; the objects themselves as well no longer were compatible in daily practice.	GoPro, Nook, TV controller, phone, flip phone, screen,
<b>Technological Archives of the Self</b>	Descriptions are rich in detail with affect and performances of self through technology and attention to the attendant times and places.	iPod, CD player, VideoNow,
<b>Performing Kinship</b>	Instances that highlight how objects are intertwined with performing kinship that include social engagement with the object, acts of giving and acts of retaining.	Wii, PS2, camera, video camera, computer mouse, phone
<b>Technology and Social Space</b>	Instances that demonstrate the ways in which obsolete electronic objects make and shape spatial dimensions of everyday life. Also instances in which space and the categorization of electronics as waste are connected.	CD Player, Wii, Walkman

Closely related were other responses focused on the functional value of an object, noting a lack of any emotional attachment during or after the period of intense or regular use. In these cases, engaging with junk drawer objects generates inventories of everyday things while at the same time revealing 'ethical and aesthetic concerns' and the circulation of values embedded within electronic material cultures (Martínez 2017: 346). In some ways, student responses to electronic objects reinforced what has already been identified in the literature: the way in which waste is a 'by-product of the systematic ordering and classification of matter, in our societies co-related with modernity and the values of efficiency and productivity' (ibid.).

This is also consistent with studies that show continued use value will prolong the time of storage of seemingly obsolete electronics. For example, in a study of cell phone replacement and storage among 181 UK students 18–25 years of age, Wilson and colleagues (Wilson et al. 2017) found that over three quarters of their respondents ( $n = 106$ ) kept one or more phones 'as a spare' in storage (528). Storing older no-longer-in-use cell phones at home in order to have a spare was a common practice also noted in Finland (Ylä-Mella et al. 2015). Wilson and colleagues referred to this phenomenon as 'hibernation,' i.e., the period of time between when a phone was placed in storage and when it was removed from storage and then otherwise discarded. Many participants elaborated further that they kept one or more spares as a way to retain their newest phone longer and in better condition. Older spare phones were described as functioning

as a 'sacrificial device' for use during outings that might pose a higher risk of cell phone damage or loss such as 'festivals, events, travelling, holidays, or on nights out...' (Wilson et al. 2017: 522, 528). However, Ylä-Mella et al. (2015: 381) also speculated that 'personal attachment' might account for delays in turning cell phones in for recycling. In a study examining the impact of state e-waste bans in the U.S.

Similar to the findings from Wilson, for some students, the functional value of an object was the most evocative characteristic of the object with which they were engaged. The quotes below, from three different students, highlight these functional dimensions of electronic life histories expressed by some of our participants:

- a. I have used this object for three years now and have used it while trekking and cycling. I originally purchased it to document a trans-continental bike tour. It would have limited emotional connection to others. [GoPro]
- b. This GPS was given to me as a gift once I got my driver's license. I do not have any emotional attachment to it but I did use it frequently after learning to drive. For others, it probably would not evoke any type of emotional response whatsoever.
- c. I just wish it could be repaired and reused for somebody else that may need it. I do not have any kind of emotion/history towards this screen.

Additionally, in two separate classroom discussions, there seemed to be a connection between the expres-

sion of value exhaustion, a sense of the neutrality for an object and the clear classification as waste to be thrown out.

### Consumerism and Technological Obsolescence

There were responses that connected a discussed electronic device most closely to a history of consumption and technological obsolescence. We saw these themes manifest through attention to faults, flaws and failures, as well as indications of functional replacement by newer devices. In reflection, respondents looked back, and saw these electronics as part of moments in their life that had already passed; the objects themselves as well no longer were compatible in daily practice either with other devices or with lifeways.

- a. It does not have anything special. It could be special if it is repaired and reused. Right now it represents an obsolete screen that accumulates dust; it is occupying valuable space. [screen]
- b. There is little monetary value to the object but the design history of the object and the discontinuation of the product is interesting. [flip phone]

### Performing Kinship and Identity (Past, Present and Future)

Within this set of responses, specific narratives highlighted how objects were intertwined with performing kinship: acts of giving that left residues that served to fortify relationships, act as 'keepsakes' or nostalgic mementos of growing up, touchstones for shared experiences, etc. A life history of a PlayStation 2 (PS2) provides a particularly insightful example of the importance of electronic objects to enacting and remembering sibling connection. In an audio story centered on the PS2, the younger of two brothers narrates three significant stages with the object: 1) as it enters the household as a Christmas gift when the brothers were middle-schoolers; 2) when it leaves with the older brother to college; 3) when it is re-gifted to the younger brother as he goes to college. The PS2, an electronic object with positive affective value connecting the siblings in stage 1 is missed for the activity of playing in stage 2 only to be understood as a kind of 'sticky object' in stage 3:

Fast forward to 2017, I'm now a junior in college. I still have the PS2. It sits in the living room gathering dust, behind our TV in the house that we're renting near campus. I haven't played it since the summer my brother left for college. I had no desire to play by myself or even with my roommates. I realized that what I had missed so badly in high school, wasn't the PS2. It was my brother. I've kept it, like parents keep old photo albums as a reminder of all the good times we shared in the basement of our house playing the PS2 in the dark, with the volume on 2.

In another videogame console story, this time centering on the Wii, playing is performing family togetherness and considered a social experience:

... I have two brothers and we all used the Wii a fair amount when we were younger. ... the Wii being the focal point of whatever was happening in the room, means that using the Wii was always a really social experience.... I remember, I played a lot of Lego Star Wars with one or both of my brothers and a lot of times my mom or dad would watch even if they didn't necessarily want to play. My Wii brought the family together and I hope that eventually I'll be able to use it regularly again once I have space either in my parents' house or my own home. But until then it sits in the basement, waiting like an old friend.

These phenomena are not limited to videogame consoles, or brothers (**Figure 6**).

In these examples, electronic objects are active components of familial relations and are sometimes so saturated with meaning and memory that the object—rather than the person or persons—appears able to activate or mediate feelings and practices.

The performance of identity and kinship need not be limited to the time of use or extend only from the present backwards. Devices like the iPod—or the Walkman for an earlier generation—demonstrate generational connections to novel forms of technology (Mannheim 1952; see discussion in Taipale et al. 2018), prompting some to speculate that their saved devices will be important



My sister had it for several years ... and then gave it to me almost two years ago now. I brought it to Purdue with me ...I've used it for a few hours at a time to use the computer or play video games. Because of this, I am somewhat emotionally attached to the mouse; it was a gift and has been a useful tool and toy.

**Figure 6: Computer mouse as practice of kinship.** Photo and text submitted by student as part of junk drawer project response.



to anticipated future family members, such as imagined future children and grandchildren. This is demonstrated explicitly in the excerpt that opens this paper and is also articulated by student who recalls the personal and social significance of his iPod in the first part of his narrative and then moves on to consider its anticipated continued significance in an imagined future:

It was the device that made music personal for me. It was personal in a shared way, if that makes any sense. I remember in third or fourth grade on the bus my friends and I had this headphone splitter and we'd share my iPod and the music on there and I think that's when I started to associate music with emotions. I took the iPod with me everywhere I went. When times got rough, I would go listen to my music on my iPod. When I was in a good mood and trying to start my day off right, I'd plug my iPod into the iHome dock and blare the music through the house. I really don't have a need to keep it any more now. Over the past couple of years, it's been replaced by phone after phone and music streaming services. And it's been through three or four moves to new houses. Yet, I still always keep hold of it... I know it's capable of lasting long enough for me to be able to show my kids what an iPod was and what we did before we could just type the song in and have it appear in the endless music library that we have today. And even looking how it's going to incredibly impact my future, this product has guided what I look for and what I incorporate in products that I use and the products I want to design in the future.

### Technological Archives of the Self

Descriptions are rich in detail with affect and performances of self through technology in these responses. They situate reflection in attendant times, places and activities. A typical response tends to recognize a certain degree of technological obsolescence while highlighting an object's continued ability to act as an archive or record of personal history, taste and/or act as a kind of site or object of memory (Nora 1996; Legg 2005).

- a. Although the Nano cannot take pictures or play videos, it could store my hundreds of songs. I would take it with me on car trips or fall asleep listening to my favorite singers. Once I upgraded to a newer, fancier iPod Touch a few years later I no longer needed my old iPod. Because my iPod Nano had my name engraved on the back of it and still held all of my music I did not get rid of it. I continue to have it, although I cannot remember the last time I used it. [nano]
- b. I used this object as a phone, but it did much more than make and receive calls/texts. I used this phone to check emails, organize my tasks, read, check Facebook, Instagram and Snapchat, play fun little games, and much more. To me this phone was the medium by which I connected

with the people throughout various stages in my life. It is still functional for playing music, playing games, surfing the web, and can still connect to Wi-Fi, but it does not make or receive calls or texts. Individually, this iPhone prompts me to keep it. When I bought a new phone I just kept this iPhone because I didn't know what to do with it. Now I am happy that I didn't get rid of it because it has contacts, old emails, and pictures on it. Also, I just have this little sentimental value of it. It has been through a lot with me; it was given to me as a graduation present in May of 2012 and was used until November of 2014. I have a lot of memories connected with it, which is probably why I didn't want to get rid of it in the first place. Socially, this iPhone requires the action of recycling. It could possibly be resold, but no one would want an iPhone with a shattered back. [smart phone]

Devices in this category are variable, but tend to consist of things that can receive, retain or playback variable content. Thus, iPods, smart phones, video cameras and early portable DVD players are well represented among the student responses we have gathered so far.<sup>8</sup>

### Technology, Social Spaces and the Everyday

As with other studies on e-waste and digital media in American households, several responses also showed the ways in which electronic objects make and shape spatial dimensions of everyday life. For us, this played out in home spaces, where reflections reveal that electronic objects have the power to shape micro-spheres of practice, command attention and act as a point of socio-spatial organization. A response that clearly illuminated these relations appears through the history of a Wii as it transitioned from the living room to the basement:

...my old Wii currently lives in the basement, where it hasn't been used for probably close to two years. And the reason it hasn't been used is, there isn't really enough space in the basement to ... use the Wii as intended. And this is something that's really unique about the Wii... it's such an unusual way of interacting with technology. And part of that was, its main selling point was you could just wave a remote around rather than having to push buttons on the controller, but this meant that the Wii had to exist in your home, in a way that was different than pretty much all other electronics. The Wii needed a dedicated space, because whenever anyone was using the Wii, just by the nature of how they would play it, nothing else could really be happening in that room, or if it did then the Wii would still have to be the focal point.

Electronic objects can also be markers of home, or more generally the combination of routines and objects that constitute the familiarity of a place (experienced and remembered). However, social spaces can also influence the acceptability of electronics within them, and thus,

their presence or absence. Moving from childhood homes to student dorms produced decisions to leave behind devices like CD players that might dominate a space sonically or require too much physical space. In some cases, these objects seem to waver between valued as marking a life-stage and devalued as e-waste.

### Conclusion

These preliminary findings reveal that the meanings people affix to these objects, their home storage practices, and their relationships to those same objects are multifaceted and complex. As opposed to other waste literature that demonstrates the ways in which waste is disorderly, abject, or disgusting,<sup>9</sup> our work shows that objects that are at the interstices of wasting practices embody, represent, and express many meanings to participants socially, spatially, and structurally. While objects were representations of broader categorical classifications (e.g. as representations of systems of obsolescence), many of the students did not talk about reusing, recycling, or repurposing electronic objects to give these objects meaning. Instead, even when they were not actively used, objects already had and were imbued with multiple meanings, some of which changed over time. Thus, their renewal, would somehow disrupt the meaning-making that was already part of the fabric of intertwined individual and object histories. In this sense, our work shows that it is not the in-between condition where objects are 'waiting for a new life, available for new relationships and reconstitutions ... demanding a more intimate engagement with material and wasting practices' (Martínez 2017: 349), but rather the in-between condition where relationships and reconstitutions have already been made and are made visible.

We see closet fill or junk drawers of electronic devices, bits, bytes and peripherals as situationally valued through a constellation of factors that include emotional attachments, technological obsolescence, imagined use-value, as well as discrepancies between perceived value and market value. While the problem of closet fill has been discussed by scholars, how electronics enter this interstitial stage, why they remain and the particular relationships people have with objects have not been as closely examined. We suggest a life history approach can make these interstitial phases visible in a way that illuminates the shifting judgments of value that affect the scale of e-waste distribution, speed and timing of circulation. In this way, our work moves away from identifying causal connections around use and discard, but instead focuses on identifying broader patterns of meaning and value that shape decisions about objects at particular points in their life histories.

In closing, we found that the Junk Drawer exercise has multiple strengths as an interdisciplinary method. First, the junk drawer project engages artistic strategies and material culture methods as praxis through inviting students to produce visual representations, spoken narratives and, in some cases installations, of electronic objects. In this process, students interrogate their relationships and connections to these 'saved' objects and how they have circulated in their own and other's lives. Through collective presentation that visualizes and vocalizes reflections along

with group discussion, students have the opportunity to recognize social and generational patterns. Thus, the project has the potential to bridge their own proximate intensely individualized notions of electronics in everyday lives with readily available 'e-wasteland' images, which depict conditions that may seem distant and detached from lived experience in the American context. Second, the project invites participants to become co-researchers with the Electronic Life Histories Project team through autoethnographic practices. In this way, the junk drawer project asks participants to perform ethnography on objects that are within their own 'private worlds' thereby drawing from their 'own experiences as the source from which to investigate a particular phenomenon' (Méndez 2013: 282). Third, this project brings qualitative and arts-based research into the classroom, exposing students to team-based and multimodal forms of research practice. Finally, this project raises students' awareness about the e-waste problem through the 'micro-politics of everyday practice' (Braidotti 2011).

### Notes

<sup>1</sup> This is from one of 18 narratives recorded in an undergraduate upper division interdisciplinary course focused on the societal implications of design and technology.

<sup>2</sup> <http://www.dailymail.co.uk/news/article-3049457/Where-computer-goes-die-Shocking-pictures-toxic-electronic-graveyards-Africa-West-dumps-old-PCs-laptops-microwaves-fridges-phones.html>.

<sup>3</sup> <http://money.cnn.com/2017/01/16/technology/e-waste-asia-increase-problem/>.

<sup>4</sup> The issue here is less one of an unrecognized health hazard within the home, but more an important opportunity to understand individual/household waste-making and levels of ecological awareness in a phase of the electronic life history that has been largely unexamined.

Though see Lara Houston's work on electronic repair (Houston et al. 2016, Houston 2017).

<sup>5</sup> The reasons for storing rather than disposing of e-waste are varied. While we focus on the affective dimensions of holding onto e-waste in this article, other reasons include inconvenience, cost, lack of knowledge about how to responsibly discard e-waste, a belief that something useful or creative might be done with saved objects and time constraints. Existing research has documented some of these same tensions. For example, Milovantseva and Saphores (2013) have noted that very few respondents (2.4%) admitted to disposing of phones in the municipal trash and speculated that this may be due to data security concerns, which has been a recurring theme in the larger EHLP project. Additionally, in discussing the factors that best predict whether cell phones are recycled they suggest that storage is an option resulting from a lack of awareness of recycling options. Though awareness of recycling legislation and knowledge of where and how to recycle certainly affect actual recycling, our research and that of Wilson et al. (2017), suggests the storage of electronics in the home involves a number of factors beyond simply not knowing how to recycle.

<sup>6</sup> See for example: <http://www.hgtv.com/design/decorating/design-101/20-actually-useful-items-to-keep-in-your-junk-drawer-pictures> and <https://www.pinterest.com/explore/junk-drawer/>. HGTV encourages viewers to spend \$218.50 to assemble contents for the perfect junk drawer.

<sup>7</sup> The original version of the junk drawer questionnaire took as its starting point a document generated by: Debby Andrews, Sarah Carter, Estella Chung, Ellen Garvey, Shirley Wajda, and Catherine Whalen. Revised based on feedback from the workshop 'Twenty Years, Twenty Questions to Ask an Object,' conducted by the Material Culture Caucus of American Studies Association at the ASA's 2014 annual meeting (see: twenty years twenty questions to ask an object).

For our pilot iteration we modified some questions, deleted others and added photo documentation strategies as part of the outcome. Since that first version, the activity has been transformed through several revisions and modifications to make it effective for examining familiar material culture and the particularities of stored electronic objects. The later versions develop creative and community/public forms of sharing through the production of video, sound installations and posters. Classroom implementation typically follows contextual readings prior to the activity and a detailed explanation of the activity with examples of best practices for photo documentation and expectations for the final form of the deliverables. Students then have on average 2–3 weeks to choose an object, answer questions about it and produce the related final forms for communicating insights.

<sup>8</sup> There seems to be an interesting generational component to the responses that the authors would like to address in a future article. The significance of iPods in middle school and high school as well as the transition from iPods to smart phones are strongly represented in responses from our students who were roughly born in the mid to late 1990s.

<sup>9</sup> See for example: <https://discardstudies.com/discardstudies-compendium/>.

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### Competing Interests

The authors have no competing interests to declare.

### References

- Ahmed, S.** 2010. Happy Objects. In: Gregg, M and Gregory, S (eds.), *The Affect Theory Reader*. Durham & London: Duke University Press.
- Alaimo, S.** 2016. *Exposed: Environmental Politics and Pleasures in Posthuman Times*. Minneapolis: University of Minnesota Press.
- Andrews, D, Carter, S, Chung, E, Garvey, E, Wajda, S and Whalen, C.** Revised based on feedback from the workshop *Twenty Years, Twenty Questions to Ask an Object*, conducted by the Material Culture Caucus of American Studies Association at the ASA's 2014 Annual Meeting.
- Arnold, J, Graesch, AP, Ragazzini, E and Ochs, E.** 2012. *Life at Home in the Twenty-First Century: 32 Families Open Their Doors*. Los Angeles: The Cotsen Institute of Archaeology Press.
- Baldé, CP, Forti, V, Gray, V, Kuehr, R and Stegmann, P.** 2017. *The Global E-waste Monitor –2017*. Bonn/Geneva/Vienna: United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA).
- Bennett, T and Joyce, P.** (eds.) 2013. *Material Powers: Cultural Studies, History and the Material Turn*. London: Routledge. DOI: <https://doi.org/10.4324/9780203883877>
- Braidotti, R.** 2011. *Nomadic Theory: The Portable Rosi Braidotti*. New York City: Columbia University Press.
- Douglas, M.** 2002. *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*. (Routledge Classics), 93. London: Routledge.
- Gabrys, J.** 2011. *Digital Rubbish: A Natural History of Electronics*. Ann Arbor: University of Michigan Press. DOI: <https://doi.org/10.3998/dcbooks.9380304.0001.001>
- Hawkins, G.** 2006. *The Ethics of Waste: How We Relate to Rubbish*. Lanham, MD: Rowman & Littlefield Publishers.
- Hetherington, K.** 2004. Secondhandedness: Consumption, Disposal, and Absent Presence. *Environment and Planning D: Society and Space*, 22(1): 157–173. DOI: <https://doi.org/10.1068/d315t>
- Houston, L.** 2017. The Timeliness of Repair. *Continent*, 6(1): 51–55. Available at: <http://continentcontinent.cc/index.php/continent/article/view/280> [Last accessed 24 October 2018].
- Houston, L, Jackson, SJ, Rosner, DK, Ahmed, SI, Young, M and Kang, L.** 2016. Values in Repair. *Proceedings of the 2016 CHI Conference on Human Factors in*

- Computing Systems*, 1403–1414. DOI: <https://doi.org/10.1145/2858036.2858470>
- Hurdley, R.** 2006. Dismantling Mantelpieces: Narrating Identities and Materializing Culture in the Home. *Sociology*, 40(4): 717–733. DOI: <https://doi.org/10.1177/0038038506065157>
- International Association of Electronics Recyclers.** 2003. *IAER Electronics Recycling Industry Report*. Albany, NY: IAER.
- Legg, S.** 2005. Contesting and Surviving Memory: Space, Nation, and Nostalgia in *Les Lieux de Mémoire. Environment and Planning D: Society and Space*, 23(4): 481–504. DOI: <https://doi.org/10.1068/d0504>
- Mannheim, K.** 1952. The Problem of Generations. In: Mannheim, K (ed.), *Essays of the Sociology of Knowledge*. Oxford: Oxford University Press.
- Martínez, F.** 2017. Waste is Not the End. For an Anthropology of Care, Maintenance and Repair. *Social Anthropology*, 25(3): 346–350. DOI: <https://doi.org/10.1111/1469-8676.12436>
- Méndez, M.** 2013. Autoethnography as a Research Method: Advantages, Limitations and Criticisms. *Colombian Applied Linguistics Journal*, 15(2): 279–287. DOI: <https://doi.org/10.14483/udistrital.jour.calj.2013.2.a09>
- Milovantseva, N and Jean-Daniel, S.** 2013. E-waste Bans and U.S. Households' Preferences for Disposing of Their E-waste. *Journal of Environmental Management*, 124: 8–16. DOI: <https://doi.org/10.1016/j.jenvman.2013.03.019>
- Nora, P.** 1996. *Realms of Memory: Construction of the French Past*. New York: Columbia University Press.
- Parikka, J.** (ed.) 2011. *MediaNatures: The Materiality of Information Technology and Electronic Waste*. London: Open Humanities Press. (Accessed as 'frozen' pdf of the living book: <http://living-booksaboutlife.org/pdfs/bookarchive/Medianatures.pdf>).
- Rathje, W.** 1979. Modern material culture studies. *Advances in Archaeological Method and Theory*, 2: 1–37.
- Rathje, W.** 1992. *Rubbish! The Archaeology of Garbage*. New York: HarperCollins.
- Rathje, W.** 2001. Integrated Archaeology: A Garbage Paradigm. In: Buchli, V and Lucas, G (eds.), *Archaeologies of the Contemporary Past*, 63–76. New York: Routledge.
- Reno, JO.** 2016. *Waste Away: Working and Living with a North American Landfill*. Berkeley: University of California Press. DOI: <https://doi.org/10.1525/california/9780520288935.001.0001>
- Saldaña, J.** 2012. *The Coding Manual for Qualitative Researchers* (No. 14). London: SAGE Publications.
- Saphores, JM, Nixon, H, Ogunseitan, O and Shapiro, A.** 2009. How Much E-waste is there in US Basements and Attics? Results from a National Survey. *Journal of Environmental Management*, 90(11): 3322–3331. DOI: <https://doi.org/10.1016/j.jenvman.2009.05.008>
- Schiffer, MB.** 1996. *Formation Processes of the Archaeological Record*. Salt Lake City: University of Utah Press.
- Schiffer, MB.** 2011. *Studying Technological Change: A Behavioral Approach*. Salt Lake City: University of Utah Press.
- Skibo, J and Michale, BS.** 2008. *People and Things: A Behavioral Approach to Material Culture*. New York: Springer. DOI: <https://doi.org/10.1007/978-0-387-76527-3>
- Taipale, S, Wilska, T-A and Gilleard, C.** 2018. Introduction. In: Taipale, S, et al. (eds.), *Digital Technologies and Generational Identity ICT Usage Across the Life Course*, 1–8. New York: Routledge.
- Thill, B.** 2015. *Waste (Object Lessons)*. Bloomsbury Academic Press: Salt Lake City.
- Wilson, GT, Smalley, G, Suckling, JR, Lilley, D, Lee, J and Mawle, R.** 2017. The Hibernating Mobile Phone: Dead Storage as a Barrier to Efficient Electronic Waste Recovery. *Waste Management*, 60: 521–533. DOI: <https://doi.org/10.1016/j.wasman.2016.12.023>
- Ylä-Mella, J, Keiski, RL and Pongrácz, E.** 2015. Electronic Waste Recovery in Finland: Consumer's Perceptions Towards Recycling and Re-use of Mobile Phones. *Waste Management*, 45: 374–384. DOI: <https://doi.org/10.1016/j.wasman.2015.02.031>

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