

On Appropriation and Nostalgic Reminiscence of Technology

Fatemeh Alizadeh
University of Siegen
Fatemeh.alizadeh@uni-siegen.de

Alarith Uhde
University of Siegen
alarith.uhde@uni-siegen.de

Aikaterini Mniestri
University of Siegen
aikaterini.mniestri@student.uni-siegen.de

Gunnar Stevens
University of Siegen
gunnar.stevens@uni-siegen.de



Figure 1: We asked participants to take photos of outdated devices they no longer use but keep at home and to describe their memories of these devices. P36 recalled how he enjoyed using the game controller upside down to play a game.

ABSTRACT

Technological objects present themselves as necessary, only to become obsolete faster than ever before. This phenomenon has led to a population that experiences a plethora of technological objects and interfaces as they age, which become associated with certain stages of life and disappear thereafter. Noting the expanding body of literature within HCI about appropriation, our work pinpoints an area that needs more attention, “outdated technologies.” In other words, we assert that design practices can profit as much from imaginaries of the future as they can from reassessing artefacts from the past in a critical way. In a two-week fieldwork with 37 HCI students, we gathered an international collection of nostalgic devices from 14 different countries to investigate what memories people still have of older technologies and the ways in which these memories reveal normative and accidental use of technological objects. We found that participants primarily remembered older technologies with positive connotations and shared memories of how they had adapted and appropriated these technologies, rather than normative uses. We refer to this phenomenon as nostalgic reminiscence. In the future, we would like to develop this concept further by discussing how nostalgic reminiscence can be operationalized to stimulate speculative design in the present.

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CCS CONCEPTS

• **Human-centered computing**; • **Interaction design**; • **Interaction design process and methods**; • **Contextual design**;

KEYWORDS

Interaction design, memories, remembering, appropriation, nostalgia, storytelling

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1 INTRODUCTION

There is an economic urgency to constantly invent needs that can be met by new technologies. Yet we should not be quick to set aside the past to make room for the future. In this paper, we look at “outdated” technologies that have made it all the way from production to consumer’s home and eventually to their dustbin. We look at their normative uses, the ways in which they have been appropriated, and the feelings they still evoke. We argue that outdated technologies are rich sources of design storytelling, particularly when it comes to the manifold ways users have appropriated them in different cultural contexts. That is to say our paper responds to a notable lack of investigations into the appropriation of past technologies. We draw inspiration from Soro et al. [31] and their challenge that design is not a “future-oriented discipline” to explore how appropriation of past technologies can become a valuable resource for storytelling and design processes.

Following the tradition among CHI authors that discuss users’ appropriation of technologies in everyday life settings [2, 18, 26, 34],

we conducted a two-week fieldwork study with 37 human-computer interaction graduate students from 14 different countries in Germany. During the study, students reported on their memories of outdated devices, now out of use, in their homes and reflected on their memories of the devices and how they feel about them now. The study was followed by a workshop to gather participants' interpretations of these experiences. We found that people overwhelmingly remember outdated technologies with positive connotations. They also reported positive memories of accidental uses. The findings from this work, and in particular the positive emotions associated with nostalgic memories of outdated technologies, led to the need for further conceptual work to respond to users' storytelling.

Based on Soro's idea, and the data that our results yielded, we propose a new term, 'nostalgic reminiscence,' to the Human Computer Interaction (HCI) community to investigate how the past can be operationalized to stimulate speculative design. We define the nostalgic reminiscence of a technological artefact as a form of reflective nostalgia [4], whose purpose is not to revive the artefact itself, but to acknowledge its situatedness in the complex web of uses and relations that it engendered within its given environment. By nostalgic reminiscence, we seek to describe the range of emotional responses that users express in their narratives about outdated technologies that appear to require four ingredients: a) a connection to childhood, b) physical control and ownership of the device, c) significant effort and time invested in the device, and d) social context of use or sociality otherwise associated with the device.

2 RELATED WORK

HCI researchers have long noted that people do not always 'play by the rules' of technological objects [10]. Indeed, appropriating different media to fit one's "rules" is often critical to getting things done in everyday life. In this section, we use the appropriation literature available in combination with studies of memory in HCI discourse to argue that design has much to gain from the study of memory and the past, and designers ought to "take ownership of the past" [31], not only to prevent repeating the same mistakes, but also to define and advance moments of progress.

2.1 Designing for appropriation

Throughout this section, we seek to understand how the literature in the field has embraced appropriation not as an accident in the use of technology, but rather as a positive phenomenon that signals users' acceptance of the technology. The study of appropriation has allowed researchers to push the boundaries of the epistemology of design; by examining how users appropriate technological objects, designers gain multiple perspectives on the information hidden within an object's properties. Dourish [11] defines appropriation as "the process by which people adopt and adapt technologies, fitting them into their working practice" and underlines that designing for appropriation can lay bare the multiple applications of a system, which thereby push designers to organize information in ways "meaningful to users".

While appropriation might resemble customization at a surface level, the concept encapsulates the "ongoing, incremental adaptation of interactive technologies . . . inherent to the emergence of practice"

rather than a singular event of system modulation. Taking up the challenge of making designs appropriable by users, Dix [10] further expands on the agency of the appropriating user and comments on the potential harms of failing to communicate the essence of a control. The author argues that since users are bound to bypass a system's controls, it is crucial to 'expose the intentions' of a design and let users understand why controls are there in the first place. At the same time, Flint and Turner [12] pay close attention to the capacity of users to understand and to perceive the affordances of digital artefacts. They then introduce *enactive appropriation* to address enactive use of technology that 'naturally' leads to exploitation of new and invisible affordances.

Overall, existing literature shows that appropriation of technologies allows designers to stumble upon unexpected uses for technologies and researchers to imagine how to better meet users' needs. However, the presented approaches to appropriation are relatively straightforward and address unexpected yet active and purposeful uses of technologies. Exploitation of accidental affordances, sometimes leads to accidental interactions that the designer not only does not expect, but also does not approve of. In this respect, appropriation goes far beyond unexpected uses of technology to encompass a broader range of interactions caused by what Norman referred to as *accidental affordances* or *misleading signifiers* (e.g., the accidental affordance of flat surfaces to "support" can be used for the disposal of empty drink containers, then the discarded container becomes a signifier that it is permissible to deposit one's objects there) [21].

Moreover, appropriation research has tended to be forward-looking; Researchers are primarily interested in studying the affordances of current or future technologies in order to further optimize their design (e.g., [9, 16]). As a result, people's experiences with and appropriation of past technologies are still rarely studied [30]. In other words, we still do not know how the past technologies have been naturally used in everyday practices. People's fixation with outdated technologies and its resurgence in recent years (so-called tech nostalgia) [6] raises the question of how we can study appropriation from this angle and whether it can reveal users' accidental experiences and situational interpretations through the lens of the personal and cultural contexts in which they are embedded.

2.2 HCI and positive reminiscence

In the field of psychology Sellen & Whittaker define reminiscing as "a special case of recollection that helps people re-live past experiences for emotional or sentimental reasons" [27]. In other words, it is a lively and emotional way to remember the past, as opposed to more rational and analytic, reflective remembering. For its immersive, emotional, and experiential nature, reminiscence has been shown to function as a form of "mental time travel" with significant effects on mental health and emotional well-being [32]. Studies of people's engagement with their past in their everyday lives, have shown how remembering is embedded in the material surroundings, for example through personal belongings [13, 19]. People tend to attach meaning to items that occupy space in their physical environment [23]. Such "mementos" can serve different functions for their owners; some may be displayed to be noticed, appreciated,

and shared with others (e.g., a family photo frame). Others are embedded in daily life and serve as a routinized source of comfort and familiarity (e.g., a personal coffee mug). Still others are carefully concealed to maximize the impact of their future disclosure to self or others (e.g., a love letter) [23]. There is a growing literature on how users experience a particular remembering practice [22], the interaction patterns, and the emotional capacity of remembered past experiences (e.g., [17, 24]).

Campopiano [6] first observed that nostalgia, the longing to relive past experiences felt by a group or an individual, can also apply to technological objects. He refers to this phenomenon as “tech-nostalgia” defined as “fond reminiscence of, or longing for, outdated technology” (Wiktionary.org, 2012) [35]. Through this broad definition, the author offers examples of such technologies and explains that people use them as sense-making mechanisms to revitalize outmoded media, which also end up creating something entirely new [6]. As Boym points out, despite our nostalgic urges, we can never truly return to the past or even recreate an exact facsimile of the object of our nostalgia, be it a place or an artefact [4]. However, as contended by Umar Ismail et al., [33] nostalgia can have a positive, even therapeutic role in people’s lives. The deliberate, active process of recalling past events under the supervision of scientists, has shown statistically significant results when it comes to the mental well-being of patients, particularly those with dementia. The authors refer to the “recall of the past by deliberately focusing on cherished and happy memories” as nostalgic reminiscence [33]. We seek to make a contribution to the field of HCI by adapting this his active and strategic form of recollecting memories to the recollection of outdated technologies. In other words, we define nostalgic reminiscence in the research area of HCI as the purposeful recollection of past technological objects that elicit a nostalgic response, versus ordinary technological objects, as part of a critical process that unveils use cases and affordances that have not been recorded in the past or held little value for the designers of that time in history.

As interaction designers explore the dynamic relationship between users and interactive products, [25] memories can be a treasure trove of undiscovered opportunities for design. After all, active remembering can uncover opportunities for design that might never have had a chance to materialize. Despite this fact, previous studies in HCI have focused on memory as a desirable effect of interaction design, rather than a catalyst in the design process itself. In this paper, we aim to fill this gap by looking back to explore the variety of voices hidden in memories and engage with them in productive ways to discover the unexpected and normative uses of past technologies.

3 METHOD

Self-reports and diaries have been shown to contribute well to memory studies when initiated by a participant while memory is still fresh [6]. In this study, we investigated people’s memories of their experiences with old devices that are kept even though they are no longer used. We were particularly interested in how participants recalled their interactions with these devices and whether their memories included unexpected and accidental uses of technologies in the past. Since outdated technology is often associated with the

older generation, we decided to collect data from the younger generation and find out how they remember the old technology. We also wanted to have a multicultural user base. Most importantly, we address an important gap in intersectional research into user appropriation and we point to the benefits of a culturally inclusive set of perspectives. Our participants were master’s students in the field of HCI in Germany. They came from 14 different countries, were between 20 and 33 years old ($M=26$ years), and 29 of them were female (78%). Their living situations varied from living alone, with roommates, to living with the whole family. They were told that the purpose of the study was to learn more about their experiences with older devices compared to new generations. They were also informed about and consented to the use of the data and images for research purposes.

3.1 Data collection

To collect data, we conducted two weeks of fieldwork followed by an interpretation workshop. The fieldwork consisted of two activities: (1) actively searching for and recording old devices that were no longer used at home (either in Germany or in their home country), and (2) self-reporting of how the devices were used in the past. We prompted students with two open-ended sentences, “When I think of [the device], I feel ...” and “I remember ...”. This provided a minimum amount of guidance necessary for the study. To ensure that our interpretation of the reports did not differ from that of the participants, we conducted an interpretation workshop and gathered insights from the participants about the report entries that expanded on the themes of the report entries and complemented the qualitative findings. Due to the COVID 19 pandemic, the workshop was conducted online and lasted one hour, during which participants in groups of 3-4, shared their memories of using the outdated devices with each other and with us via Zoom. We used the workshop not only to deepen our insights from the self-reports, but also as a technique to promote collective remembering. Our workshop ended with a discussion about how we can apply the findings to our own design practices.

3.2 Analysis

A total of 42 items and their associated stories were collected. Three reports were not related to the research topic and were subsequently removed (i.e., they were either not about memories with devices at home or about current rather than outdated devices). Following the qualitative thematic analysis [5], two researchers created a codebook and coded the data using a deductive coding process. We used deductive coding because we were looking for specific themes in the memories (e.g., appropriation). The codebook was further developed/grew during the coding process, new codes were added (e.g., social dynamics), and categories were reordered. One week after the workshop, we presented and discussed the main findings and results with the participants in a feedback session.

4 FINDINGS

In this section, we provide an overview of the results and the themes related to our research questions. We begin with a comparison of the collected devices and associated memories from the self-reports, and then move on to the findings around the observed



Figure 2: The collected devices ranged from non-electronic (butter churn and typewriter) to electronic (heater and cassette player) to digital (game console).

phenomenon of "nostalgic reminiscence" from the reports and their further expansion in the workshop.

4.1 Type of the devices

Because we did not give participants a precise definition of "outdated" and left it up to interpretation, the collected devices varied widely in terms of when they were commonly used. They ranged from older generation digital game consoles to typewriters that were a few decades old to a hundred-year-old butter churn (see Figure 2). 71% (N=30) of the mentioned devices were electronic. The most common of these were televisions with black and white screens (N=5). Among non-electronic devices, typewriters were the most frequently mentioned (N=5). Devices also differed by the country in which they were used. Figure 2 shows devices from four different countries. The butter churn (maselnica) was used in Poland (Figure 2, left), the briquette heater was from Korea, the multifunctional cassette player was from India, and the typewriter and game console were used in Germany.

4.2 Memories of technology: I remember . . .

Some anthropological studies have shown that personal things have a biography as they go through a series of changes, from a gift to a commodity to an irreplaceable possession [14]. These stories surrounding things are so closely interwoven with people's life histories and autobiographies that they cannot be studied separately [15]. Our preliminary findings have revealed three main elements in the narratives about the outdated technologies: 1) what stage of life they were associated with, 2) what role the device played and how it was used, and finally 3) in what social context the device was used.

4.2.1 Stage of life. For different generations, certain technological objects are experientially associated with a particular period of life, such as childhood or adolescence. Sometimes these objects even acquire extraordinary significance when they get entangled in the events of a person's life [15]. We found that childhood is the life stage most associated with participants' narratives about outdated technologies. A good example is the story of P13 who recalls his experience with the outdated TV as follows, "*I remember playing with the TV antenna as a kid to get a signal. That's what I miss, because me, my siblings and cousins were always all excited to see who could turn the antenna the best. In fact, that was an activity that we always lobbied for*" [P13].

4.2.2 Lost interactions. When it comes to the role of the devices in the stories, 76% of the participants (N=26) referred to their unexpected or accidental use that disappeared over time. In contrast, only 29% mentioned the normative use of the device, which is still possible with newer technologies (the two groups are not mutually exclusive). An example of this is P26, who mentioned rewinding the tapes to pass the time, "*I remember rewinding the tapes with my index finger every chance I got. That was a pastime I miss the most!*" [P26].

Dix referred to appropriation as a source of control and ownership for users [10]. In this context, P7 raised the physicality of the old devices as an important aspect, "*I painted the cover of the CDs and used them as decorations. When I have a CD that I can see and touch, I feel like I OWN it and the music is really mine*" [P7]. We also observed a pattern in the photos provided by participants where physicality allowed users to exert control by covering and hiding the device from others. Figure 3 shows two images, one, of a sewing machine from India and another, of a television from Nigeria without and under the cover. P2 explains his experience with the TV as follows, "*I remember my grandfather locking the TV when he did not want us to see it.*" [P2].

Aside from appropriation, memories seemed to be a good resource for keeping track of the limitations of older technologies and weighing the costs against the benefits of being able to afford more. More than half of the participants (N=18) mentioned the limitations and constraints of the devices (often in retrospect as pleasant experiences) in their accounts. As evidenced by previous studies of biographical objects [23], these limitations have contributed to the creation of meaning, often because the user invested more time and effort into the device. P6 addresses this by recalling his interaction with his VCR as follows, "*I remember picking up the tape and tuning it in because it was not a meaningless and automatic experience like we have nowadays when we randomly select something from a streaming library. I felt that by having to do these things, I was more present and had more control over the process*" [P6].

4.2.3 Social dynamics. Consistent with previous research on reminiscence [13], memories of the old devices were generally stories in which the device played a role that was significant to the story. But not necessary those in which the participants were the owner or even the user of the device themselves. In some stories the participant was just an observer of the interaction who was affected by the interaction. A good example is P11 describing the memory of her father's pager: "*I remember once my father and I went to the library*



Figure 3: TV from Nigeria and sewing machine from India without and under cover



Figure 4: P34's Nintendo64



Figure 5: P14's Turntable

to study. After studying for a whole day, we heard the vibration of my father's pager. I remember how slowly the message appeared and we had to wait only to read a simple message from my mom, asking us to come back home. But it was so nice at that time" [P11].

Some participants also mentioned the important role of the older device in changing social dynamics and engaging in more social interactions. P15 mentioned that the briquette heater (see Figure 2 center) played a central role in bringing people together, "In order to heat an entire room evenly, the heater was placed in the center of the room. This naturally created a gathering place for people" [P15]. We have found that memories that focus on interactions between users or between users and observers are critical to the narrative of technology. These narratives help us not only to decipher users' past practices, but also to contextualize the old devices in their everyday use.

4.3 Emotions: I feel . . .

Several research papers have confirmed the existence of the positive memory bias (the so-called rosy view) [20], where people tend to evaluate their past more positively than it actually was, be it better school reports [3] or better medical test results [7, 8]. Our results also show a strong dominance of positive feelings (81%, N=29), compared to mixed (N=2) and negative ones (N=2). Even when mentioning the disadvantages and limitations of older technologies, participants chose positive associations, "We did not have as many opportunities to play different games (see Figure 4), but it was an easier time, we found happiness in small things" [P34].

Moreover, 68% of the participants (N=25) referred to feeling nostalgic about the device. Some like P10 mentioned the word nostalgia explicitly and some like P14 implicitly described the nostalgic feeling they had, as yearning to get back in time, "When I think about the CD player, I feel nostalgic and it takes me right back to my childhood days" [P10]. And "When I think about the turntable (see Figure 5) feel yearning to get back and see my grandmother again whom I spent many hours with trying to label the buttons with bright tape, so she could still make them out in spite of her vision impairment" [P14].

The mixed and negative feelings toward the devices were either related to specific events or situations, or to a work-related context in which frustration with the shortcomings of the older technology played an important role. As an example, P25 mentioned her mother's memories of the DVD player when she was an English teacher and used it in her classrooms, "My mother had more unpleasant memories than good ones. She said: 'DVDs get scratched easily and become unusable, if you play them too many times.' Often, she had to stop the DVD player and read the English passage aloud to the students instead of playing the audio. But as she continued to reminisce, she said, 'DVDs were one of the first forms of entertainment technology that she experienced'" [P25].

5 DISCUSSION

In the study presented here, we examined memories of the outdated devices to find out more about how users remember the old technologies and what feelings they evoke. Our very heterogeneous sample group provided us with a collection of nostalgic outdated technologies from 14 different countries and the stories associated with them. The initial results show that users use three main elements in their narratives, namely a) the lost interactions with the device, b) the life stage, c) and the social context in which they used it. In addition, we found that storytelling about technological devices is strongly intertwined not only with the individual's past, but also with family history. Thus, apart from creating a "sense of selfhood" [15], narratives about technology contributed to the participants' collective identity.

5.1 Lesson learned: nostalgic reminiscence

Our participants not only remembered the normative use of the older devices, but also, and even more frequently, how they appropriated them. We observed that these interactions (even the limitations and drawbacks) were often referred to with positive connotations such as "fun," "pleasant," and "nostalgic". As noted by Umar Ismail et al. [33], there is "consistent and robust evidence for the positive effects of nostalgic reminiscence" on various levels,

within the context of clinical practice. Acknowledging that significance of nostalgic reminiscence in the medical field, we aim to apply the concept to outdated technologies so as to expand HCI discourse by elaborating on how the positive effects of nostalgic reminiscence can open up new avenues in speculative design. That is to say, deliberate recollection of past technological objects that elicit a nostalgic response, versus ordinary technological objects, can become a part of a critical process that unveils use cases and affordances that have not been recorded in the past or held little value for the designers of that time in history. As a result, nostalgic reminiscence offers an “off-modern” approach to interacting with past technologies, as it allows human computer interaction researchers to “take a detour from the deterministic narratives” [4] of the history of technology. The nostalgic reminiscence is not purely due to cognitive positive biases or the so-called fading effect (i.e., affects related to unpleasant events in the past fade in memory faster than affects related to pleasant events [1, 28, 29]), but also to the meaning associated with the older technology. Our study suggests that this meaning creation requires four ingredients: a) a connection to childhood b) physical control and ownership of the device c) significant effort and time invested in the device, and d) social context of use or sociality otherwise associated with the device.

5.2 Limitation and Future Work

The results of this study have pushed us to combine HCI expertise with insights from memory research and nostalgia theory to discuss our findings in the context of a promising concept, nostalgic reminiscence. However, it should also be mentioned that this work is still in progress and has some shortcomings. To mention just a few: We have only observed how the younger generation reminisce the outdated technology that has definitely influenced our collected devices and shared memories. To further conceptualize the observed phenomenon and assess its scope, we need to conduct the study with a broader sample. In addition, our study raises the question of how the process of nostalgic reminiscence works and what factors influence it. In other words, why do participants hold on to their positive experiences? What happened to the negative memories, did participants forget them at some point and if so, why? In the future, we would like to explore these questions and also further investigate the role of technology in family histories and collective identities. We also aim to found out how nostalgic reminiscence can be operationalized to implement a process of speculative design in the present [18].

We hope that our very culturally diverse sample will present the academic community with a more nuanced set of stories about outdated technologies and make a case for nostalgia, not as a mere longing for a lost past, but as a method of examining what technological devices really mean in the lives of real people.

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