

Possession and dispossession: a dual phenomenon in digital artefacts

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Abstract

A modern user's interactions with digital artefacts are a subject of interest to numerous fields of study, including human-computer interaction (HCI). Innovations in HCI necessitate an understanding of users' attachment to these artefacts. This paper characterises user attachment as a dual phenomenon of possession and dispossession. The findings give deeper insight into the influences of this phenomenon and how they might distinguish its manifestation in physical and virtual environments. Avenues for design interventions were then interpreted from these findings.

Keywords: virtual possession, virtual dispossession, interaction design, human-centred design, behavioural design

1. Introduction

Consumers' attachment to the objects and commodities they use has always been relevant for corporations and entities involved in product innovation, development, manufacturing, or sales. Research suggests that consumers' attachment and personal relationship with a product can influence their preferred consumption mode (Wolf and Schuster 2019). A study by Wolf et al. (2018) found that consumers are more reluctant to forsake ownership and opt for access-based consumption of material objects into which they have a level of self-extension. In our paper, we examine attachment digital artefacts which are moving into an increasingly access-based consumer model (Watkins et al. 2016). Attachments to digital artefacts are thus unique and distinct, and an understanding of them is pertinent for researchers and professionals working in consumer behaviour, interaction design, and related areas.

The perceptions of digital and non-digital artefacts were studied by Odom et al. (2009) in an interview-based work. They concluded that participants did not often express strong emotional attachment with digital artefacts, whereas they did with non-digital artefacts. Furthermore, they concluded that participants' attachment to digital artefacts was static with time and age, while it improved with non-digital ones. In contradiction, Turner and Turner (2011) found in their study employing the repertory grid technique that many digital artefacts had a personal meaning and were valued by consumers even after their life cycle expired or they had been superseded in the market. Subsequent literature has found that consumers form meaningful emotional attachments with digital artefacts and that these attachments are distinct in many ways from those formed with non-digital artefacts (Odom et al. 2010, Odom et al. 2013, Odom et al. 2014, Kirk & Swain 2018). This formation of attachment with an artefact is described as the *acquisition* of that artefact (Odom et al. 2009).

In this paper, we define an artefact that a person has thusly acquired as a possession. Previous research on virtual possessions has used the term possession to refer to artefacts without a material form with which a user interacts (Odom et al. 2010). We propose an updated definition to draw a meaningful

distinction between mere digital artefacts and digital artefacts to which a user has developed an attachment - or, in other words, acquired. Thus, acquisition is the process by which an *artefact* becomes a *possession*. We refer to this separate class of digital artefacts as virtual possessions.

This paper examines how young users acquire artefacts in their daily lives and sustain their attachment to them. The objective is to reveal what affects and informs these attachments, and subsequently infer the implications of such insights on research and practice. It identifies motivations for forming these attachments, the sites where they form, and the processes of formation. Furthermore, it inquires into how they may subsequently detach from their possessions, willfully or involuntarily, and how the sites, motivations, and processes of acquisition also determine de-acquisition and detachment, thus characterising them as a dual phenomenon. It then argues that this dual phenomenon can be of significant interest to practitioners in interaction design and HCI.

The paper is organised as follows: Section 2 provides research background on attachment to artefacts and virtual possessions; Section 3 outlines the research methodology; Section 4 describes the key findings from the study; Section 5 proposes some design opportunities in the domain of HCI interpreted from the findings; Section 6 concludes the paper with limitations.

2. Research background

For over half a century, researchers have studied and documented people's attachments to their material possessions. Material possession attachment is the relationship between an individual and an artefact that this individual has appropriated (emotionally or personally), de-commodified, and singularised through interaction (Kleine and Baker 2004). Consumer behaviour psychologists have examined these attachments to understand better post-purchase psychological processes beyond primary satisfaction (Dwayne Ball and Tasaki 1992). An understanding of how consumers use items to develop and maintain their self-concept is equally relevant in the digital world (Dwayne Ball and Tasaki 1992).

Digital virtual goods (DVGs), objects that cannot be used in material reality but exist within digital spaces, are now moving to an access-based consumer model from a traditionally ownership-based one (Watkins et al. 2016). For example, buying copies of a movie is outdated. Consumers subscribe to a streaming service to get recurring access to that movie. Consumers rarely desire possession of physical items they do not fully own (Bardhi and Eckhardt 2012). DVGs, however, elicit different interactions with consumers. Watkins et al. (2016) argue that DVGs cannot fully be classified as "owned" or "accessed" items. The fragmented ownership that consumers have with DVGs requires a more transitional way of looking at possession (Odom et al. 2013). In digital spaces, possession and ownership need not fully coexist; the idea of "possession" evolves into meanings of its own without the necessary existence of "ownership".

A nuanced understanding of digital attachment necessitates a separation of the two phenomena of possession and ownership. Digital virtual commodities are "owned", whereas some digital items are just "possessed". Possession implies a form of attachment with the item, but not a formal sense of ownership. Thus, the ownership of a possession can be fragmented and ambiguous (Watkins et al. 2016). In their study, Watkins et al. (2016) highlight personal identification with commodities as a manifestation of the phenomenon of possession. In our findings, we look at some more attachments, alongside personal identification, that are formed by possession. The artefacts towards which users feel this attachment or identification are *possessions*. In this paper, we maintain the use of the following terms the way they commonly appeared in our literature review: "virtual possessions" (proposed by Odom et al. 2010), "digital artefacts" (not virtual artefacts; literature on DVGs informs this word choice), "virtual environment" (the site for virtual possession), "material/physical artefacts" (material and physical have the same meaning here).

2.1. Virtual possessions

Virtual possessions still need to be characterised precisely. They have certain distinctly different properties from material possessions; therefore, characteristics such as ownership, attachment, and interaction need to be separately analysed in virtual contexts. Odom et al. (2014) found three attributes of virtual possessions that singularise consumer interactions with them: placelessness, spacelessness, and formlessness. These attributes catalyse differences in treatment between material and virtual

possessions; for example, in many instances, virtual possessions are perceived as inherently less valuable (Odom et al. 2014). There is still a vast scope for exploring many more influences and subtleties in attachment to virtual possessions.

In this paper, we redefine the notion of virtual possessions. We define a digital artefact as an object with which a user interacts and a virtual possession as an artefact with which a user has developed an attachment. We also propose “possession” as an alternative word for “acquisition”, which refers to the phenomenon by which an artefact becomes a possession. This definition allows us to distinguish between “dispossession” (later discussed in the paper) and “possession” and characterise them as a dual phenomenon.

The notion of affordances explains why people act and interact (with artefacts and surroundings) based on perceptions of the form, function, and utility of physical components. These material properties of artefacts describe the various action possibilities available for users to interact with (Seidel et al. 2013). Affordances are relational to the user, i.e., they come into existence when placed in a user’s context (Hopkins 2020). In digital contexts, affordances are attributes that enable users to engage in specific interactions with digital artefacts and not others. In enabling or constraining a user’s interactions with a digital artefact, affordances can also determine the nature and degree of ownership or possession towards the artefact (Kirk and Swain 2018).

Kirk et al. (2015) proposed that the *appropriation* of technology, which refers to the “customisation and idiosyncratic use of technology”, is a form of self-design (distinct individuality or identity). They further argue that these processes of appropriation can influence users’ feelings of psychological ownership toward a digital artefact. We discuss instances of this occurrence in our findings.

2.2. Virtual dispossession

Although relatively unexplored in literature, the dispossession of material things (Roster 2001) plays a critical role in how users develop connections and attachments to things. As possession of new things takes place, so does the dispossession of old things (Gerritsen et al. 2016). Pierce et al. reframed the consumption of potentially durable material goods into four dimensions: acquisition, possession, dispossession, and reacquisition (Pierce and Paulos 2011). Similarly, Huang and Trong (2008) investigated mobile phones’ acquisition, ownership, disposal, and replacement. Scholars now look at material items considering the processes of acquisition, possession, and dispossession rather than as something simply “consumed”.

In this paper, we use the term “dispossession” to refer to the detachment of a user from an artefact. Researchers have investigated consumer behaviours, considering digital artefacts to be a separate class of artefacts (Odom et al. 2010). Just as possession and acquisition occur differently in virtual environments (Odom et al. 2010), so do dispossession and re-acquisition. Furthermore, we extrapolate how the influences on possession may be relevant to the dispossession phenomenon.

In addition to affordance appropriation, users’ construction of personal narratives (Odom et al. 2011) and engagement (Oyedele et al. 2018) with an artefact influence their attachment to it. Oyedele et al. (2018) describe the correlation between engagement and experience with technology. They discuss the role of emotional, cognitive, and behavioural engagement in the overall UX of a product. In our findings, we see the key presence of engagement in users’ possessions.

3. Methodology

Our study investigates possession and dispossession of digital artefacts. We attempt to identify how participants form attachments while interacting with artefacts, how they engage with affordances and appropriate technology, and focus on influences that contribute to these phenomena. We additionally wanted to identify any distinctions between physical and virtual environments. Furthermore, we wanted to identify avenues for design interventions based on our findings.

We used a qualitative study to examine the phenomena. The study methodology involved semi-structured interviews with ten digitally literate young individuals studying at a university (Yin 2009). The participants’ ages ranged from 17 to 25 years. The intention of our study was not to generalise, per se. We were interested in knowing unique experiences and attachments of the individuals. After ten interviews, we felt we had gathered a sufficient and diverse array of observations which could be

coded into interesting themes. We selected young users as they tend to be more digitally connected than older users in India; different age groups would have drastically different relationships with virtual environments which could be hard to reconcile in one study. The participants were from diverse cultural backgrounds across India, which could inform the ways in which they treat their objects and surroundings. However, they came from similar economic classes, which disproportionately affects exposure to technology in India than culture. Their educational background enabled them to introspect and verbalise their observations easily with us. In the following sections, we refer to each participant by a pseudonym followed by their age.

The interviews were approximately between 30 to 50 minutes each. They were structured to discuss the sites of, the processes behind, and the motivations driving a feeling of possession and the counterpart feeling of dispossession that the participants may feel towards digital artefacts. We began each interview by asking participants to talk about an artefact that holds significant value or is meaningful to them. We probed them about their feelings towards the artefact by asking when they became attached to it, what they felt when they interacted with it, what personal narratives may have been associated with it, and if they saw themselves parting with it. We subsequently led the discussion to their interactions with physical artefacts in their lives. We asked participants how attached they were to physical paraphernalia and items of significance. We asked them what drove them to become attached. We frequently asked them “How much would it bother you if you were to lose X item?” to gauge their attachment. We then asked them about their experience with losing interest or becoming detached from objects and what catalyses this disconnect. We similarly tried to reveal insights about their interactions with digital artefacts in the second half of the interview. Participants automatically made comparisons to physical items, so we inquired more along that line. We proposed some scenarios to them according to the context; for example, “Would it mean differently to you to receive a handwritten letter than a digital note into which a person put the same amount of effort?” We discussed what reasonings and experiences informed their answer. We finally asked them if there were differences in the duration of attachment, frequency of detachment, and catalysts of detachment in virtual spaces.

The synchronous nature of the exchange was perhaps prohibitive for the participants to reflect deliberately upon their interactions for a long time; there was pressure to respond in real-time. After an analysis of the first few interviews, we felt that the participants might be able to articulate better if they reflected on their interactions ahead in time (they frequently expressed being unable to think back on their interactions immediately). In subsequent interviews, wherein we asked participants to reflect in advance, we found that the participants were able to verbalise subtle behaviours and motivations better. We took audio recordings of all the interviews and notes during the discussions. We transcribed the recordings and repeatedly reviewed and compared them to the notes taken during the interviews. We then extracted observations from each transcript and gave them conceptual labels (Corbin and Strauss 1990). Concepts were grouped according to similarity and arranged in categories iteratively. After this process, the final five categories became the themes we discuss in the following section. These themes provided a more nuanced insight into user attachment and revealed some critical considerations for designing interactive systems, which we detail in section 5.

4. Findings

The interviews revealed a diverse array of artefacts that participants felt attachment towards, including childhood playthings, gifts, items of personal artistic expression, and daily objects of convenience and utility. Motivation emerged to be a more significant determining factor influencing attachment. Participants did not comment as heavily on the sites and processes of attachment.

In the discussions, participants conveyed a strong propensity to be attached to material artefacts with either a personal narrative element, an affordance for self-expression, or a significant utility in their lives. They valued and cherished artefacts that they perceived as an extension of their self-identity due to personal narratives, such as a family history. *“I have a coin that’s been passed down generations to the oldest son in my family. [...] I don’t feel like it’s my personal belonging; I feel more like a caretaker of this coin. It is one of my most valuable possessions [...] When I thought I’d lost it, I felt so sad and disappointed. Luckily, I found it again, and I’ve kept it more safely.”* (Umair, 22).

Participants spoke of personal narratives surrounding their possessions primarily in the physical space. With digital artefacts, they spoke more in terms of utility and functionality than personal narratives while describing their attachment. Umair described their childhood experiences as a significant influence on how they build narratives around artefacts. *“I’ve spent my childhood building identity around physical objects. Interacting with them is ingrained in me. Maybe the next generation of kids won’t feel a difference between physical and digital objects.”* (Umair, 22). Participants also intrinsically ascribed a greater “value” to physical artefacts than their digital counterparts. In one instance, the quality of wearing out, of having a lifespan, made physical items more precious for Abe. *“A physical note from a friend is something I’d have to intentionally take care of. There’s the wear-and-tear component that makes it valuable. A digital note is always there, I know it’s not going anywhere. Comparatively, I’d value the physical thing more.”* (Abe, 22). Here, the notion of preciousness is correlated with “value”.

The themes that emerged from the analysis described in section 3 are discussed in the following subsections.

4.1. Temporal qualities

Participants mentioned the permanence of digital artefacts as a significant property distinguishing them from their physical counterparts. *“Paradoxically, I lose track of virtual objects more easily because they’re always there.”* (Abe, 22). Most participants reported ascribing a feeling of preciousness to physical items that tend to wear and tear and wither with age. In contrast, digital artefacts, which are unchanging over time, do not evoke the same degree of preciousness with their users. Interestingly, one participant mentioned activities they undertake for the upkeep of a treasured personal item - dusting, rearranging, careful transportation - that strengthened the degree of possession they felt towards the item. The impermanence and fragile nature of a physical artefact catalyse this kind of engagement from the user. The static nature of digital artefacts gives users security and assurance that they are not going anywhere. Thus, it is easier to ignore or forget about them.

Looking back at the three aspects of attachment to virtual possessions we wished to inquire into (the motivation for, the sites of, and the processes behind), we infer that the permanent temporal quality of a digital artefact diminishes the motivation for a user to engage with it. A feasible site for engagement exists as a human-computer interface through which the user interacts with their virtual possession. However, it cannot be clearly established whether users find engagement via a virtual interface as gratifying as engagement with the tangible physicality of a physical material possession. *“I don’t know if I’m a little old-school that way, but I feel like virtual objects are just a part of our imaginations. The lack of physical connection with them affects how I feel about them.”* (Abe, 22). Others, too, echoed Abe’s sentiment and expressed an imagined barrier between themselves and their digital artefacts that dampened their engagement and attachment.

4.2. Replaceability

Akin to their temporal qualities, participants associated digital artefacts being replaceable with being less *valuable*. A digital item can be easily duplicated and stored in multiple locations, making it much harder to lose permanently. Digital artefacts can invariably be reproduced to exaction, so a lost item could be precisely re-made as it was. *“If I lost a [video game that I liked a lot], I wouldn’t be too bothered about it. I could just go around the internet looking for a replacement or something that’s fairly similar. Something I can touch and feel - like a controller - I can’t replace so easily.”* (Nick, 23).

Users are not motivated to engage in the upkeep and maintenance of a virtual item as it is easily replaceable. *“I could make several copies of a digital photograph in different locations, but not with an old physical childhood album, so I am much more careful in handling [the latter].”* (Umair, 22).

In fact, the replaceable and permanent quality of virtual items could provide users with the reverse motivation to disengage from their possessions. A lack of engagement in the upkeep and maintenance of a virtual possession urges them to disconnect, ignore, or forget it, thereby enabling dispossession to occur.

4.3. Utilitarian motivations

Many participants associated with their virtual possessions in a primarily utilitarian capacity. Personal and emotional narratives do not seem to manifest as strongly in virtual spaces (this could be attributed in part to the replaceable and easily replicable nature of virtual items discussed previously). Thus, attachment to and engagement with virtual items for many participants was driven by two considerations: utility and affordances for use. *“I use my phone’s in-built camera app a lot more than Google Photos because I find it easier to use. So, in a way, I’m more attached to that app simply because I use it more frequently.”* (Ira, 21).

Feelings of attachment towards components, UI elements (such as a Chrome feature), and digital services were strongly motivated by utilitarian considerations. Participants reported being frequently engaged with virtual items that had a significant utility in their lives. Sage said the digital artefact they were most attached to was Google Chrome because of its constant presence in their daily life. *“The first thing I do every time I work is open Chrome and check my e-mail.”* (Sage, 20).

Engagement and attachment are enabled by the affordances of their virtual possessions. A virtual item with intuitive and useful affordances allows users to interact repeatedly. Users thereby acquired it as a valued virtual possession faster. Participants also voluntarily disengaged from artefacts that no longer provided meaningful utility. Nick said they quit playing a video game when they no longer got the satisfaction of “getting better”; they felt like their time invested was reaping no benefit. They also described having to make a conscious effort to stop playing video games that detrimentally affected them. *“I quit Valorant because it made me a little toxic.”* (Nick, 23).

4.4. Spatial arrangements and familiarity

“When I play on the badminton court at home, I know the space like the back of my hand - where to stand so the light doesn’t fall in my eyes, where the boundaries are, the patterns on the floorboards. When I come to [the college campus] after a break and play here, it takes a while for me to adjust to the new space.” (Sage, 20).

Users are attached to familiar objects (Schifferstein and Zwartkruis-Pelgrim 2008). Comfort and familiarity play a vital role as driving factors causing engagement and attachment. Participants spoke of familiarity with a material possession in spatial terms: for example, Sage described being intimately acquainted with the lighting and bounds of a badminton court, and Ira viewed the space inside their pencil pouch to be representative of different layers of their art journey: *“There is some stationery at the bottom of the pouch which I bought long, long ago and I barely touch [...] some of the pens don’t even work, probably, but I keep them anyway.”* The stationery on top was what they accessed frequently, but they reminisced about their school days when looking at the older stuff at the bottom.

Participants brought up the notion of familiarity with their virtual possessions while discussing detachment and re-acquisition. We infer that being familiar with a possession removes users’ motivation to seek replacements or alternatives. *“For the longest time, I didn’t make the switch from Spotify to YouTube Music because of the sheer effort it is to re-build playlists in a new platform. I guess you could say that I wanted to disengage from Spotify but, due to inertia or lethargy, didn’t.”* (Abe, 22). Similarly, greater familiarity with an artefact may delay the dispossession.

Sage also described a latency in acquiring a new and unfamiliar badminton court as their possession. Interestingly, they factored a social element as an influence on this latency. If they and all their friends switched to a new court, they would acquire familiarity with it much faster than if they were to start playing at a new court alone.

4.5. Self-expression in virtual spaces

Participants closely linked self-identity and self-expression with the personal narratives surrounding an artefact. Umair’s coin was strongly linked to their self-identity because of the narrative of family history tied to it. Umair didn’t have a virtual possession with a comparably strong personal narrative because their stories were tied to physical items. Ira similarly projected their self-identity onto their pencil pouch. *“I see myself as an equipped person. The pouch is so full of stuff that it’s tearing at the edges [...] I don’t even use most of the stuff. But it gives me that sense of being ready and equipped.”*

(Ira, 21). Ira *appropriated* the physical qualities of the pouch to express themselves. These physical qualities, or affordances, became the *site* for an attachment to form via the process of self-expression or projection of self-identity. For Umair, the motivation to self-express was their family history narrative surrounding the coin; they hence appropriate the physical features of the coin to represent an aspect of their identity. For Ira, the motivation stemmed from repeated interactions with the pencil pouch. As they used it and filled it with items, it started to become a site for self-expression.

Participants described some personal narratives they built around digital artefacts, too. Abe described a video game called Football Manager that they played as a form of self-expression. *“Being a manager for a football team is a pipe dream of mine. It’s never going to happen in real life, so I was living it out through the game. I took the game like a literal job [...] I played dedicatedly for a while, and when I felt saturated with the task, I quit.”* (Abe, 22). Abe’s self-expression through this game can be seen as their appropriation of the character of a football manager to project themselves onto. The digital affordances of the game interface become enablers for appropriation and, thereby, attachment. Ira also spoke of their habit of “recording” her memories by taking photographs. *“I don’t particularly like taking photos of myself or even photos with friends. But I love recording my experiences by taking photos of beautiful things, places, and activities.”* (Ira, 21). Ira has created personal narratives of memories in their photo album by the affordance of capturing things through their camera app.

In summation, our study finds that participants have more *motivation* to get attached and remain attached to their physical artefacts. One notable influence is the construction of personal narratives around the artefacts, and consequently, the ability to self-express. Fewer affordances are available for users to manipulate and appropriate for themselves in virtual artefacts. Due to either an already ingrained familiarity with physical artefacts (due to factors such as early childhood interactions) or due to the material physicality itself, users appropriate physical artefacts with their self-identity more naturally. A second influence we found to have strengthened attachment with a physical artefact is the upkeep involved. Virtual items are unchanging with time and easily replaceable; thus, they do not need acts of maintenance and investment from users. The absence of these acts makes virtual artefacts more forgettable and not as automatically acquirable as possessions. However, our findings suggest that two significant motivations for a user to avoid dispossession of a virtual artefact are utility and familiarity.

In the next section, we outline some determinants for the domain of interaction design that are informed by these findings. It must be noted that the applicability of these determinants and findings is constricted by the participant pool selected for this study.

5. Opportunities in interaction design and HCI

The emotional relationships between users and digital artefacts are highly relevant considerations for the design of virtual interactions (Turner and Turner 2013). In section 2, we delineate engagement as a determinant of attachment. Thus, by extension, attachment also becomes an important consideration for UX. Meschtscherjakov et al. (2014) focus on emotional attachment as a subset of UX in a study of attachment to mobile phones. Although UX and emotional attachment are not identical, they are closely related (Law et al. 2009). Our study ties the constructs of possession and dispossession (defined in section 2) to user attachment, thus contributing to interaction design and HCI. It suggests ways for designers to achieve the desired responses and attachments from users interacting with their creations. For instance, they may want to prevent users from seeking alternatives to their platform or to build intimate familiarity between digital artefacts and users. The suggestions are discussed in the following subsections.

5.1. Utility as a determinant

Our findings show that the replaceable and permanent qualities of digital artefacts deter users from repeated interactions, without which they cannot acquire an attachment or familiarity with the artefact, thus making disengagement and dispossession easier. Our interviews with participants imply that utility is a strong motivation for users to acquire a digital artefact into their sphere of usage, making it more likely for them to have repeated interactions with the artefact. Emphasising long-term usability can nurture a stronger and less breakable emotional relationship between the user and the digital artefact.

5.2. Enabling appropriation of an artefact

An integral part of a satisfying UX is the presence of affordances for users to manipulate an artefact's material qualities according to their needs. Our findings discuss instances where participants appropriated digital affordances provided by artefacts such as a phone camera or a video game character to suit themselves. Designing to allow multiple, and even varied, affordances for a digital product would allow users to project themselves onto the tangible attributes of the product. This appropriation of the product's qualities by the user can result in the creation of personal relationships with it, thus potentially addressing the fact that fewer personal narratives tend to be formed with digital artefacts.

5.3. Acquisition, maintenance, and upkeep

The recurrent act of maintaining a cherished possession is distinctive of physical artefacts. As we discussed in our findings, the lack of necessity for such upkeep caused participants to engage less and ascribe lesser value to a digital possession. Thus, the maintenance of an artefact can be considered a significant force in driving attachment and delaying dispossession. At a fundamental level, the acts of maintenance serve as a channel for conscious engagement and provide a site for emotional attachment to be nurtured. The design of digital artefacts can provide such sites for users to engage consciously and interact repeatedly. By doing so, digital artefacts that have been acquired as possessions may remain so for longer, and their speedy de-acquisition may be addressed.

5.4. The inertia of familiarity

Users are loath to disengage from familiar objects. Our findings discuss the participants' reticence to seek alternatives or replacements for familiar artefacts. This can be characterised as an inertia that makes it harder for users to disengage from a familiar system and engage with an unfamiliar one. Hence, in some instances, a designer may rely on a user's de-facto familiarity with a digital artefact as a deterrent from seeking replacements or alternatives. Utilising familiar and already-acquired scripts and entities in an item's design could prompt easier user attachment.

5.5. Voluntary disengagement

In some virtual environments, particularly online media spaces, being attached and spending more time can become cognitively overstimulating or a dependency for some users. These virtual spaces are often designed to encourage continuous engagement from users, so they may be unable to disengage if it becomes detrimental to them. We discussed in the findings how Nick had to consciously make an effort to disengage from a video game that made them "toxic". In most instances, user attachment is desirable to designers and corporate entities, and detachment and dispossession are undesirable. However, user autonomy and well-being are important considerations while manipulating the affordances of a digital space or artefact to discourage dispossession. Ethical design would include avenues for voluntary disengagement from virtual spaces.

6. Conclusion

In this paper, we explore how young users form attachments with digital artefacts and how they are distinct from those with physical artefacts. The study revealed that users find fewer affordances to self-express with digital artefacts and interact with them in a more utilitarian capacity compared to physical artefacts. It further revealed that the level of attachment and engagement a user experiences can be determined by influences such as conscious acts of upkeep and maintenance, spatial or personal familiarity, and the building of personal narratives. Users' emotional attachments are characterised by the dual phenomena of possession and dispossession. The role of the aforementioned influences in the dual phenomena is examined. Based on these findings, we propose *utility as a determinant, enabling appropriation of an artefact, maintenance and upkeep, and the inertia of familiarity* as opportunities for design and further research in HCI.

A clear limitation of our study is the participant pool. Our participants were highly digitally literate from good economic and educational backgrounds. Additionally, the real-time nature of the interviews may have been prohibitive for some participants to reflect deeply on their virtual interactions and

communicate them to us. Employing a more extended ethnographic study of participants' virtual possessions may be more fruitful for future research. Studying participants from more diverse backgrounds may reveal different kinds of possessions and different influences on their attachments. Ultimately, this paper contributes to ongoing research on the nuances of user attachment and developing technology to engage users and provide meaningful experiences in digital spaces.

References

- Bardhi, F. and Eckhardt, G.M. (2012), "Access-based consumption: the case of car sharing", *Journal of Consumer Research*. Vol. 39 No.4, pp. 881-898, <https://dx.doi.org/10.1086/666376>.
- Dwayne Ball, A. and Tasaki, L.H. (1992), "The Role and Measurement of Attachment in Consumer Behavior", *Journal of Consumer Psychology*, Vol. 1 No. 2, pp. 155-172, [https://dx.doi.org/10.1016/S1057-7408\(08\)80055-1](https://dx.doi.org/10.1016/S1057-7408(08)80055-1).
- Corbin, J.M. and Strauss, A., 1990. Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative sociology*, 13(1), pp.3-21, <https://dx.doi.org/10.1515/zfsoz-1990-0602>.
- Gerritsen, D.B., Tasse, D., Olsen, J.K., Vlahovic, T.A., Gulotta, R., Odom, W., Wiese, J. and Zimmerman, J., (2016), "Mailing archived emails as postcards: Probing the value of virtual collections". In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pp. 1187-1199, <https://dx.doi.org/10.1145/2858036.2858541>.
- Hopkins, J. (2016), "The Concept of Affordances in Digital Media", in Friese, H., Rebane, G., Nolden, M. and Schreiter, M. (Eds.), *Handbuch Soziale Praktiken Und Digitale Alltagswelten*, Springer Fachmedien Wiesbaden, Wiesbaden, pp. 1-8, https://dx.doi.org/10.1007/978-3-658-08460-8_67-1.
- Kirk, C.P. and Swain, S.D. (2018), "Consumer psychological ownership of digital technology", *Psychological Ownership and Consumer Behavior*, Springer International Publishing, Cham, <https://dx.doi.org/10.1007/978-3-319-77158-8>.
- Kirk, C.P., Swain, S.D. and Gaskin, J.E. (2016), "I'm Proud of It: Consumer Technology Appropriation and Psychological Ownership", in Obal, M.W., Krey, N. and Bushardt, C. (Eds.), *Let's Get Engaged! Crossing the Threshold of Marketing's Engagement Era*, Springer International Publishing, Cham, pp. 643-645, https://dx.doi.org/10.1007/978-3-319-11815-4_199.
- Kleine, S. S., & Baker, S. M. (2004). An integrative review of material possession attachment. *Academy of marketing science review*, Vol. 1 No. 1 pp. 1-39.
- Law, E.L.-C., Roto, V., Hassenzahl, M. and Vemeeren, A. (2009), "Understanding, scoping and defining user experience: a survey approach". In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 719-728), <https://dx.doi.org/10.1145/1518701.1518813>.
- Meschtscherjakov, A., Wilfinger, D. and Tscheligi, M. (2014), "Mobile attachment causes and consequences for emotional bonding with mobile phones", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 2317-2326, <https://dx.doi.org/10.1145/2556288.2557295>.
- Odom, W., Pierce, J., Stolterman, E. and Blevis, E. (2009), "Understanding why we preserve some things and discard others in the context of interaction design", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 1053-1062, <https://dx.doi.org/10.1145/1518701.1518862>.
- Odom, W., Zimmerman, J. and Forlizzi, J. (2010), "Virtual possessions", *Proceedings of the 8th ACM Conference on Designing Interactive Systems*, pp. 368-371, <https://dx.doi.org/10.1145/1858171.1858240>.
- Odom, W., Zimmerman, J. and Forlizzi, J. (2011), "Teenagers and their virtual possessions: design opportunities and issues", In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 1491-1500, <https://dx.doi.org/10.1145/1978942.1979161>.
- Odom, W., Zimmerman, J. and Forlizzi, J. (2014), "Placelessness, spacelessness, and formlessness: experiential qualities of virtual possessions", *Proceedings of the 2014 Conference on Designing Interactive Systems*, pp. 985-994, <https://dx.doi.org/10.1145/2598510.2598577>.
- Odom, W., Zimmerman, J., Forlizzi, J., López Higuera, A., Marchitto, M., Cañas, J., Lim, Y., et al. (2013), "Fragmentation and transition: understanding perceptions of virtual possessions among young adults in Spain, South Korea and the United States", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 1833-1842, <https://dx.doi.org/10.1145/2470654.2466242>.
- Oyedele, Y., Greunen, D. and Veldsman, A., 2018, August. UX engagement and interaction. In *2018 7th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO)* (pp. 792-798). IEEE, <https://dx.doi.org/10.1109/icrito.2018.8748639>.
- Pierce, J. and Paulos, E. (2011), "Second-hand interactions: investigating reacquisition and dispossession practices around domestic objects", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 2385-2394, <https://dx.doi.org/10.1145/1978942.1979291>.

- Roster, C.A. (2001), "Letting go: the process and meaning of dispossession in the lives of consumers", *Advances in Consumer Research*, Vol. 28 No. 1, pp. 425–430.
- Schifferstein, H.N.J. and Zwartkruis-Pelgrim, E.P.H. (2008), "Consumer-Product Attachment: Measurement and design implications", *International Journal of Design*. Vol. 2, No. 3, pp. 1-13.
- Turner, P. and Turner, S. (2011), "My Grandfather's iPod: An investigation of emotional attachment to digital and non-digital artefacts". In proceedings of the 29th annual European conference on cognitive ergonomics (pp. 149-156). <https://dx.doi.org/10.1145/2074712.2074742>.
- Turner, P. and Turner, S. (2013), "Emotional and aesthetic attachment to digital artefacts", *Cognition, Technology & Work*, Vol. 15 No. 4, pp. 403–414, <https://dx.doi.org/10.1007/s10111-012-0231-x>.
- University of Liechtenstein, Seidel, S., Recker, J., Queensland University of Technology, Vom Brocke, J., and University of Liechtenstein. (2013), "Sensemaking and Sustainable Practicing: Functional Affordances of Information Systems in Green Transformations", *MIS Quarterly*, Vol. 37 No. 4, pp. 1275–1299, <https://dx.doi.org/10.25300/MISQ/2013/37.4.13>.
- Watkins, R., Denegeri-Knott, J. and Molesworth, M. (2016), "The relationship between ownership and possession: observations from the context of digital virtual goods", *Journal of Marketing Management*. Vol. 32. No. 1-2, pp. 44-70. <https://dx.doi.org/10.1080/0267257X.2015.1089308>.
- Wolf, U. and Schuster, C. (2019), I Own, Therefore I Am? The Role of Material Possession for Consumers' Selfperception and Attitude towards Non-Ownership Consumption Modes, preprint, PsyArXiv, 14 November, <https://dx.doi.org/10.31234/osf.io/xew85>.
- Yin, R.K. (2009). *Case study research: Design and methods*. 5th ed, Thousand Oaks, Sage Publications, <https://dx.doi.org/10.33524/cjar.v14i1.73>.