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**PLATE**

Product Lifetimes  
And The Environment

# PROCEEDINGS

5<sup>th</sup> PLATE Conference  
Espoo, Finland

31 May – 2 June  
2023

**A?**

Aalto University  
School of Arts, Design  
and Architecture

**Aalto University publication series**

ART + DESIGN + ARCHITECTURE 3 / 2023  
ISBN 978-952-64-1367-9 (electronic)  
ISSN 1799-4861 (electronic)



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Images: Jere Aalto / Aalto University  
Layout: Oona Rouhiainen

# PLATE2023

**The 5<sup>th</sup> Product Lifetimes and the Environment Conference in Aalto University, Espoo, Finland, 31 May – 2 June, 2023**

The 5<sup>th</sup> international PLATE conference (Product Lifetimes and the Environment) addressed product lifetimes in the context of sustainability. The PLATE conference, which has been running since 2015, has successfully been able to establish a solid network of researchers around its core theme. The topic has come to the forefront of current (political, scientific & societal) debates due to its interconnectedness with a number of recent prominent movements, such as the circular economy, eco-design and collaborative consumption. For the 2023 edition of the conference, we encouraged researchers to propose how to extend, widen or critically re-construct thematic sessions for the PLATE conference, and the paper call was constructed based on these proposals. In this 5th PLATE conference, we had 171 paper presentations and 238 participants from 14 different countries. Beside of paper sessions we organized workshops and REPAIR exhibitions.

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5<sup>th</sup> PLATE 2023 Conference

Espoo, Finland - 31 May - 2 June 2023

## Understanding product hibernation periods with children's products and exploring motivations for product care to encourage their reuse

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**Keywords:** Product hibernation; Children's products; Product care; Reuse; Circular economy.

**Abstract:** The phenomenon of product hibernation, namely the process by which end-of-use products are kept but no longer used is a common and significant barrier to prolonging product lifespans within a circular economy. Obsolete products challenge users' decision-making process for the after-use phase and are often discarded despite being perfectly functional. Especially in households with growing children, where children's products are outgrown but not discarded, product hibernation is the result. This paper presents the survey findings of 157 hibernating children's products, and interviews with ten families with growing children in the UK who have moved house, exploring product ownership, reasons for product hibernation, and the various barriers for their reuse. Understanding owners' product care motivation for re-recognizing their value and providing choices to reuse the children's products is vital to reduce product hibernation. Further, a workshop was conducted to explore the owners' reuse experience of with their children's products and the factors affecting their consistent caring process which aim to encourage people to reuse these products more. Through an idea generation process, nine influential factors were identified that suggest opportunities to change users' perception of the value of the end-of-use and care for these products. This paper makes an original contribution to product reuse knowledge with the development of a framework for understanding reuse motivations and barriers through the lens of care.

### Introduction

In households with growing children, children's products are often outgrown but not discarded, resulting in product hibernation that may encourage wasteful attitudes. According to the British Heart Foundation, 28% of parents throw away toys that are still in perfect condition, and as many as 47% admit that their children get tired of a new toy after just one week. Additionally, more than 183 million items of kids' clothing are thrown into landfills each year (Ellen MacArthur, 2017). The average young child needs new shoes every four months, leading to a rapid replacement cycle that sees Britons buying 80 million pairs of shoes per year, most of which end up in landfills (Berg & Magnus 2020).

A transformation of the children's product industry is urgently necessary. A transition to a circular economy will support to better capture the value of underutilised and landfilled children's product. The Circular Economy (CE) aims to reduce our impact on the planet by

keeping products in circulation for as long as possible and out of landfills. It requires a systematic approach to maintain high quality products and materials. The closed-loop cycle with empowering circling longer through prolonging and reuse offers an alternative to selling significant numbers of low-cost products. In practice, this means exhausting every opportunity for reusing, re-purposing, and proving that it is possible to generate financial profit while respecting both the environment and society. One of the most environmentally friendly behaviours is to reuse the products you already own because it does not require raw material extraction or energy and water associated with new product manufacturing. As we are in the transitional stage to a CE, appropriate design approaches are needed to address people's sustainable behaviour in dealing with children's products, until a full circular system is established.

Care practices are an activity that aims to maintain value (Rodgers et al., 2019) and

support caregivers (users in this case) to rediscover and re-recognize products' value. This research explores the drivers for reuse behaviour for product maintenance, focusing on key decision-making factors through the lens of care.

## Hibernating Products

"Hibernation, the dead storage periods when a product is still retained by users at its end-of-life" is a common important barrier to the circular economy (Wilson et al., 2016). We keep things we love because they add meaning to our lives; therefore, having an emotional attachment to objects is not always bad. However, in certain cases, people take no action when they are no longer needed, piling up objects at the back of the cupboard, as they still have emotional resonance, to be forgotten, or otherwise throwing them away although they are still perfectly functional (Botsman & Rogers, 2011). Hibernating products results in increasing people's wasteful attitudes. It is, therefore, crucial to understand the factors that inform the user (or owner) decision-making processes that result in hibernating products at end of use to overcome throw-away behavior and offer promising solution alternatives.

## Methods and procedure

### Survey

In this study, a survey through a questionnaire was undertaken. In the first section, the research objectives and contexts are explained. The term 'end-of-use' object in this questionnaire refers to "objects that have ended their useful life, hence they are in a hibernation period" (Wilson et al., 2016). In the second section (1) participants were asked for their names; (2) participants' occupations were requested to provide collective and aggregate profiles that ensure that the participants were not taken from one sector. In the third section, participants were requested to answer whether they possessed hibernating or accumulated ~~objects~~ products at the end of use in their domestic environment. They were asked to list a maximum of three hibernating or accumulated products at end of use. The participants were recruited from primary school parent's groups via email communication.

### Interview

The survey result provided an overview of the products in hibernation, however, to design a complete circular system it is important to understand the users' end- of-use phase and what is restricting users' further behavior. The semi-structured interviews were conducted with people who were facing a genuinely challenging moment. These were the people who were moving to a new house within a few weeks, and who had growing children. Ten series of interviews and five casual conversations were conducted over a ten-month period. The interview participants were selected from the survey participants. The casual conversation was carried out via phone calls after a certain period of time had elapsed, when the interviewees had moved to new places. They were asked to list the objects which had been thrown away of the three they had listed, or other objects, if necessary.

By following a thematic coding analysis approach, each participant's insight was written on an individual note, in the order that the participants mentioned the barriers (or motivations). The frequency of the words used by the participants and the tone of voice were important measuring tools to understand the users' relationship with hibernating or accumulated objects at end-of-use.

### Workshop

Understanding owners' product care motivations for re-recognizing their value and providing choices to reuse the children's products are vital to reduce product hibernation. Therefore, a workshop session was conducted to explore the owner's reuse experience of their children's products and the factors affecting their consistent caring process which aim to encourage people to reuse these products more. The workshop enables the researcher to observe the participants' experience and collect data on the spot. Participants were asked to bring in their children's products in hibernation to the workshops. Additionally, they brought in children's products that had been used since their children were babies to analyze the factors affecting their consistent caring process. They were then asked to generate ideas create value for reuse. The idea generation session in the workshop lasted for two hours: ten minutes for each idea exercise on each influential factor that came out from the previous interview. Additionally, the motivations for product reuse were further discussed.

## Result

Three studies were conducted in this research to explore users' relationship with hibernating children's products.

### *Product in hibernation*

Among the 157 objects, children's toys, followed by clothing and shoes, and stationary were the most common hibernating or accumulated objects at end-of-use in the home although they are no longer needed, followed by books and furniture, and electronic related items.

### *Lingering attachment*

The survey and interview results provided an overview of people's behavioral barriers to reuse for children's products. Table 1 shows the classification of users' relationships with hibernating or accumulated objects at end of use into three different types. These are: 'users have lingering affection', 'users have lingering regret', and 'users have lingering responsibility'. A) relationship where 'users have lingering affection' toward the object. This involves the emotional aspect of attachment. B) A relationship where 'users have lingering regret' towards the object. This does not involve so much emotional attachment but involves a practical aspect of attachment. C) A relationship where 'users have lingering responsibility' towards the object.

The interview with people who had moved to new homes that has resulted in a C-type relationship does not involve so much attachment; instead, it has a high chance of disposal. Considering the responses from A2, A3, A4, and A5, there was a lingering emotional connection to those objects, and they were keeping them for a mostly unknown future for no particular reason. Users tried to avoid throwing them away but couldn't find a place where they would be needed. This indicates that objects in the C relationship require a design approach to increase the emotional connection or other external factors to reduce hibernation periods but to be taken care of. The objects in the B relationship were reluctantly thrown away except pharmaceutical and cosmetic products. When users realized their financial value, they tended to keep them for a possible next opportunity that might arise.

Types of Object-User Relations	Recorded objects	Detailed background
A. Users have lingering affection	Some gifted items (e.g. inexpensive gift from their children)  A folding table, duvet, musical instrument, board game, children's painting cards received from their children  Chocolate packaging, Jacket, Kids' pair of boots.	It was an unwanted gift and the participant kept it because owner appreciate the person who gave them.  It contained memories and history of their children and family.  Participants kept them for years even though they were not used because they liked the designs of the product.
B. Users have lingering regret	Pharmaceutical products Cosmetic products Old Mobile Phones Out dated electronics Gaming cables Kids toy Cardboard boxes A pair of running shoes Sports equipment	They were kept at the back of their drawer (or fridge) because they had forgotten them, or just in case they might need them in the future although the use-by date had expired.  It was kept because I (or my children) might need it later. Sometimes they forgot they possessed the objects.  The functionality aspect was an important reason to keep it.
C. Users have lingering responsibility	Tent kit, Children's clothing, and socks, Books, Children's car seat, Children's kitchen Utensils, Children's bed frames, and mattresses Children's furniture (desk, and bookshelf)  Children's hair accessories Children's potty A pair of running shoes Underwear Children's wetsuits	They were kept because the participants felt uncomfortable throwing them away due to the good quality of the objects and environmental concerns.  Participants don't know how to find /haven't found another user. It takes time and is not easy to find someone to giveaway due to size, and weight.  It takes up a lot of space. Difficulty of Disassembly  Fixed idea of inability to find new recipients.  Participants think it may be difficult to give it to a new recipient for reasons of hygiene.

**Table 1. Analysis of emotional factors at play for users (or owners) towards hibernating products.**

Influential Factors	Comments
Durability	<p>The quality of materials, particularly plastic, has had some influence on the lack of use up until this point, as plastic toys fail to offer long-term satisfaction.</p> <p>it is robust, and despite being plastic, it has held up and the color has not degraded at all.</p> <p>Solid Construction.</p>
Adaptability in growth of children	<p>Updating the software is not a straightforward task, and the small screen on my son's Nintendo device has become less practical as he's grown older. He uses his own laptop to play game.</p> <p>My son used to enjoy playing with his fire track plastic toy, it is no longer suitable for his current age and interests. It's not useful but I am keeping I might need it later.</p>
Adaptability in the different context	<p>Sports-related products, such as footballs, are often used for extended periods of time and can be utilized in various contexts beyond their intended sport.</p>
Modularity	<p>The plates and cutlery for children are typically designed with small sizes and specific graphics that are appealing to kids, such as the popular "Paw Patrol" characters. However, my kids have now outgrown these items and are no longer interested in using them.</p> <p>Make clothing transformable.</p> <p>I like my spiderman figure, it can move its arms, legs, and neck for different poses</p>
Expandability	<p>My children have outgrown their clothing, shoes, blankets, and other apparel, rendering them unusable. Those products can only be used for a certain amount of time.</p>
Scalability	<p>Not a particularly extendable structure but the product that I can adjust the size will be great.</p>
Rewarding experience	<p>Providing various rewards at different points is important. Rubik's cube is a timeless toy that provides me with a rewarding experience every time I play.</p>
Gender neutral	<p>Toys, soft toys, and games are often designed with gender-specific colours, such as blue and dark shades for boys and brighter colours like red, pink, and purple for girls. However, my kids are outgrown and not inclined to use products that are marketed in this way.</p> <p>I was trying to give away the toy, and then the mom said it was too boyish, her daughter might not like it.</p>
Aging gracefully	<p>Make product repairable and cleanable will create attachment.</p>

Table 2. Influential factors suggest opportunities to change users' perception of the value of the end-of-use and care for reuse.

### Design Considerations for Children's product care and reuse

Focusing on the objects in the B and C relationship, a workshop was conducted to better understand the way to recapture value from the users. Table 2 summarizes the discussion that came out through the workshop session, which is organized by the potentially influential factors that suggest opportunities to change users' perception of the value of the end-of-use and care for the products to reuse. Nine relevant factors were identified to be applied in the children's product design process, except the gender-neutral factor requires further discussion. The result of applying gender-neutral factors in the design of products could limit consumer choices. More than half of the workshop participants faced challenging moments in exploring ideas. P4 mentioned, if children's products are not designed for a specific gender, there will be a slightly better chance that they will be reused and shared. However, another participant suggested that consumers should have the option to select gender-oriented children's products rather than having no choice at all.

Forty-five concepts were generated using the factors driven by the findings from the interviews and literature review. Figure 1 shows some of the participants' ideas that came out through the workshop session for redesigning products in hibernation. A relationship among these factors was observed that will lead to the theoretical construction of the children's product care for reuse motivation model.

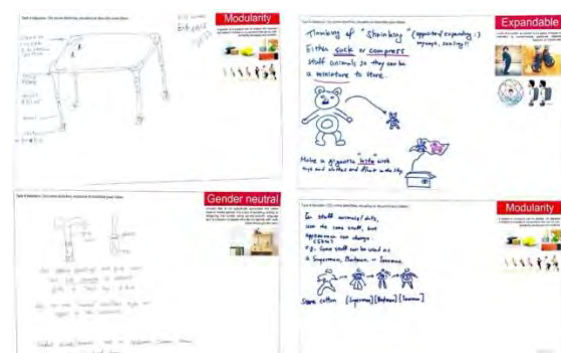


Figure 1. A selection of ideas from the workshop.

## Discussion

In order to successfully transition to the circular economy, designers are required to consider the result of hibernating or accumulated objects at end of use in an effort to prevent valuable resources from being thrown away. The product that is designed to be consistently cared for offers the ability to recreate the value of objects, reduce product hibernation periods, and be a part of a circular system.

Children's products that contain lingering affection were not considered in this research. In many cases, owners keep them in a special box or find a secure place where they can give away their objects that they still have a lingering affection for, so there is less chance they will be thrown away. The aim of this research was to explore the ways to recapture the value of products in hibernation and thereby extend the lifespan of children's products which have a high degree of lingering responsibility and lingering regret. The products in those products categories have the potential to increase product affection from users and extend product longevity through new design opportunities if there were available options or interventions for the user to recapture their reuse. The subsequent participatory workshop provided an opportunity to mediate the conversation, reminding participants about products in hibernation kept in their drawers or cupboards and allowed participants to reconsider further action in their reuse.

Although nine relevant factors have been identified during the workshop, adaptability factors tend to overlap with other factors such as modularity, expandability, and scalability. Adaptability was defined as the ability of an individual, system, or product to adjust and respond effectively to changing circumstances, environments, or requirements, which potentially could be the overarching factor that embraces modularity, expandability and scalability.

Having gender-specific toys may have less chance of being passed down or reused within the household, which can affect product longevity as it may not appeal to or be used by children of the opposite gender in the household. Additionally, keeping a product in a clean condition might also provide an opportunity for it to be cared for and reused. However, those factors clearly needs further

research. Integrating such design considerations in the design process would raise designers' awareness of environmental and social problems, and would empower users to self-care, self-reuse, and self-upcycle their existing products. Maintenance tools or service should be made widely available in the market, in order to encourage consumers to provide consistent care to their products to further encourage business potential associated with prolonging product lifespans.

## Conclusions

Shifting towards a circular economy is one proposed solution, in which products are used and their value is recovered for as long as possible in a closed-loop system. Designing products for reuse behavior in the children's product category can empower the inner circle of the economy diagram by maximizing the number of cycles. Those behaviors are one of these closed loops that can be practiced by product manufacturers and users. It is vital to understand users' reasons for keeping products in hibernation and motivations related to their reuse to encourage them to care for the products more. This paper makes an original contribution to design research knowledge by identifying new motivational factors related to reuse behaviors, particularly for children's product longevity through the lens of care.

## Acknowledgments

The authors would like to thank the survey and interview participants. Thanks, also, to the workshop participants for sharing their products in hibernation thoughts and contributions to this project.

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**Appendix**

Interviewee number	Age	Occupation	Hibernating object that's have been thrown away
A1	38	Teacher	My daughter's socks and clothes, tent kit
A2	44	Engineer	Cables, projector screen, children's car seat some old electronic product (Old Hoover, old radiator)
A3	68	Retired	Mobile phones, my children's desk and books, my children's clothing old TV, desk
A4	60	Retired	Old books, suit, my children's stationary, sports equipment, sports bag, some old electronic product
A5	44	Home manager	Children's plates and cutlery, toy, never worn clothes, hair accessories
A6	57	Home manager	Children's clothing and socks, kids' shoes, Children's' artwork, school works,
A8	64	Home manager	Kid's toy, children's clothing and socks, old plates, pharmaceutical

			products, A pair of boots and running shoes
A8	64	Home manager	Children's potty, kid's toy, cosmetic products Children's underwear, bed frame, bags
A8	64	Home manager	Pillow, toy, children's clothing and socks, shoes,
A9	39	Home manager	Children's' artwork, school works, sports equipment, sports bag

**Appendix 1. The interviewees in numbers with the objects they mentioned.**

Participants number	Living with children	Product that cares for and still using
P1	Yes	Electronic Disney watch
P2	Yes	Hair clip that is made of durable material
P3	Yes	Children's comic books Spoons, forks, plates
P4	Yes	Antique objects (objects with history)
P5	No	No
P6	Yes	Tools, Drill, Measuring Scale, T Square
P7	Yes	No
P8	Yes	Spiderman action figure
P9	Yes	Cards Sporty Viable art supplies Things that were made for her jewelry Little storage bags 3 boxes

**Appendix 2. The workshop participants in numbers with the objects they brought in.**



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