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Understanding User Motivations and Drawbacks Related to Product Repair

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Abstract

This paper presents the findings from an exploratory study that looks at current user behaviours and activities, scrutinises motivations and barriers related to product repair. Cultural probes method (Gaver, Dunne, & Pacenti, 1999) is used in order to broadly explore the motivations and drawbacks of users and to inspire them to reflect and report their experiences and concerns about repaired and broken products. Non-professional people who have got broken products, who repaired products and/or who had products repaired are selected for this study. A range of motivation and drawback categories are developed in diverse contexts that suggest opportunities to understand and change user behaviour, through design, to reduce their environmental impact. Furthermore, this study serves as a baseline research for future investigations in how to integrate repair into business models and design process in order to extend product lifespan.

Introduction

Contemporary manufacturing systems depend on large quantities of resource and energy use that cannot be sustained with the planet's finite resources. Producing long lasting and purposeful products is essential in order to decrease the rate of consumption and its negative environmental effects (McDonough & Braungart, 2002; Fletcher, 2008). Repair is an effective strategy for extending product lifespan and closing the material loops (Cooper, 2005; Ellen MacArthur Foundation, 2012). Although designing repairable products can be effective, increasing the product lifespan is also dependent upon

attitudes and behaviour of consumers (Middleton, 2012; Brook 2012; Lilley, 2007). The linear “take, make, and dispose” system has been influencing user behaviour over the twentieth century and it has become the common user behaviour to discard products before trying repair as an option (Middleton, 2012). Availability of low-priced products, repairs which are more expensive than buying a new product, planned obsolescence and rapid technological developments are some of the large-scale factors which have caused repair to lose its power on product lifespans (Brook, 2012; Gill & Lopes, 2011; König, 2013). However, it is important for designers to understand the diversity of factors and motivations involved in decisions around repair from the perspective of consumers themselves, in the context of everyday life, to inform developments in design processes and business models towards sustainability. Consequently, this study explores current behaviours and motivations of people about repair and drawbacks that prevent them from repairing.

Method

Cultural Probes is an exploratory research method that is designed to inspire people to respond to the design team in creative ways (Gaver et al. 1999). This method involves developing a probes kit, which can be seen as a physical metaphor of the asked question and a tool for participants to reflect their answers (Wallace et al. 2003). The probes approach was applied in this research to explore the motivations and drawbacks of the individuals and to inspire them to reflect and report their experiences and concerns about repaired and broken products.

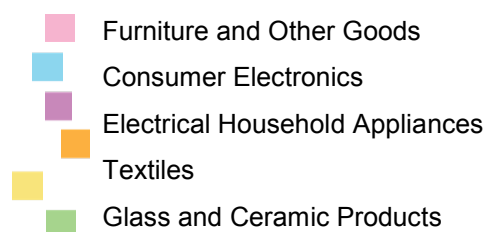
Participants were asked to take photos of broken and repaired objects and answer three questions for each object in the kit. A camera was provided for any participant who does not have a camera or a mobile phone with camera. Taking photos helps people to remember the experiences, to inspect the product, and include the aspects that they usually do not reflect on.

Cultural Probes kit lives with the people for a period. This opportunity helps people to remember the details about the questions in time. Participants were asked to return the kits with self-addressed envelopes provided in the kit.

Non-professional people who repaired objects and/or who had objects repaired, or who has broken objects, were selected for this study. These participants were found from repair parties, which held in London, and advertisements put on the websites for further. Fifty people were recruited. Details of the study were provided to participants via e-mail. Twenty-eight probes kits were mailed to participants' addresses and twenty-two of them were delivered by hand. Thirty-two of the probes kits were received back. The probes kits contained one hundred and three objects in total. Ninety-three of them were included in the analysis. After receiving the kits, the photographs which had been sent by participants, were printed and attached to the related booklets.

Affinity Diagrams

Affinity diagrams method is helpful to analyze complex information and large amount of data, and to organize them into themes (Moggridge & Atkinson, 2007). Primarily, a literature research on consumer motivations and volunteer people motivations topics were conducted in order to establish themes accommodating the related literature (Atkinson, 2006; Haski-Leventhal, 2009; Ryan & Deci, 2008). Then the products were divided into six categories with respect to the industry sectors.



Figures 1 and 2 illustrate two affinity diagrams corresponding to repaired and broken objects. Each participant's answers were put on sticky notes. These sticky notes were clustered based on the affinities which were formed through the literature. All notes referenced their original answers in case any question rises about them. Seven consumer motivations categories and six consumer drawbacks categories were developed with regards to the affinity clusters.

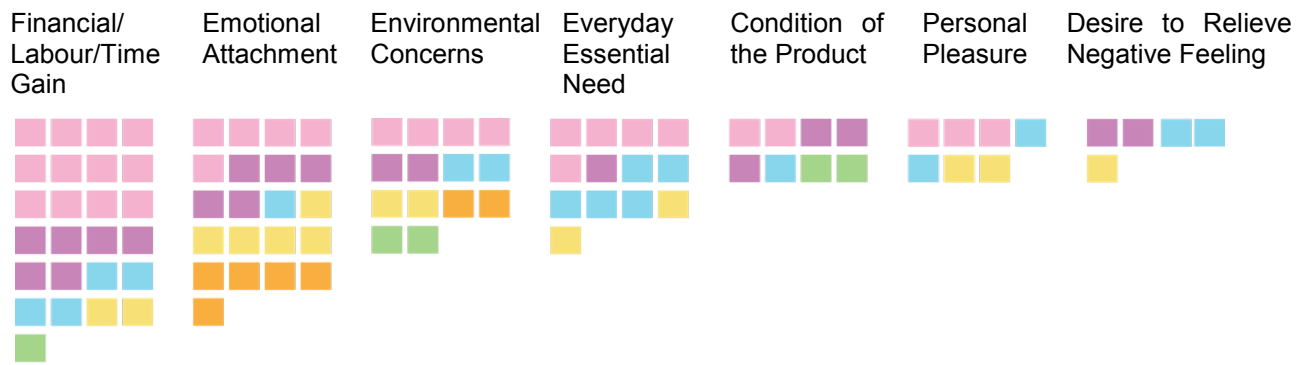


Figure 1: Consumer Motivations Categories

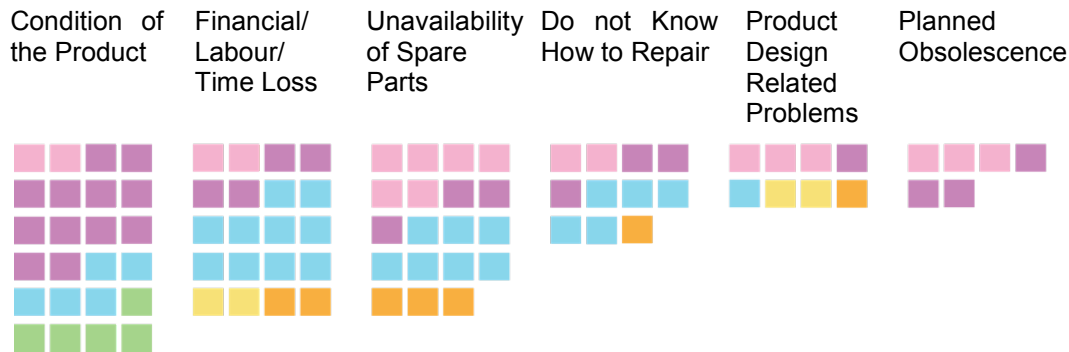


Figure 2: Consumer Drawbacks Categories

Results

Motivation Categories

- **Financial/Time/Labour Gain**

Motivation derived from financial, time and labour gain arouses as a result of the cost and benefit calculation that participants make while considering these three aspects of the repair process.

Participant 19 had the espresso machine repaired after considering financial and labour aspects of repair, as the process was easier and low-cost, compared to the product price (Figure 3).

- **Emotional Attachment**

This motivation includes products each of which has a narrative with its user such as gifts or products that have been used for a long time. A product is said to possess a narrative when users share a unique personal history with it (Chapman, 2009). When, how, and from whom we acquire the product are all significant elements of the narrative that we create.

Participant 9 had her hair dryer repaired since it was a present and nearly 30 years old (Figure 4).

Participants 2 repaired her earphones because they were birthday gifts and had an emotional value (Figure 5).

Participant 6 had his eyeglasses repaired since they were his favourite ones. He sent the product to the retailer as it was covered by the warranty (Figure 6).

- **Everyday/Essential Need**

The everyday/essential need is the motivation category that is derived from the desire to fulfil an urgent necessity. Boiler, bed, and stove are some of the products included in this category.

Participant 13 called the repairman to have her boiler fixed because she needed hot water urgently (Figure 7).

Participant 7 glued the broken ribs of his bed and he made them stable with the help of a rope (Figure 8).

- **Condition of the Product (New/Warranty)**

Users tend to repair the products which are new and under warranty.

Participant 6 contacted the technical service about the problem of his dishwasher. He reported that he had the product repaired as it was under warranty and new (Figure 9).

Participant 27 had his shoes repaired. He said he would not have spent time and money on getting his shoes fixed, if they had not been under warranty (Figure 10).

- **Desire to Relieve Negative Feeling**

The power that underlies this motivation is one's desire to relieve the negative or aversive feelings.

Participant 20 took the sandwich toaster to a repairman after it stopped functioning. Problem was a disconnected cable inside appliance but labour cost was more than half of the price of a new sandwich toaster (Figure 11). Participant 20 said: "I would feel bad if I junked it when all the other parts were working well." He had the product repaired and explained the reason of such a decision as the desire to relieve the negative feeling of throwing it away.

Participant 15 watched a video to change the battery of his laptop because he thought it was not right thing to throw a laptop away only due to its battery (Figure 12).

- **Personal Pleasure/Satisfaction**

Some participants are inspired to repair products as they are able to display their skills and eventually this process gives them personal pleasure and satisfaction.

Participant 9 said: "I thought a drying rack was not a thing that you show everyone so I repaired the broken plastic connection parts because trying to get an old object work is more satisfying than buying a new one." She added her thoughts about her broken hair drier: "I really want to know how to fix things and what causes them to fail. The learning process is awesome, and after something is fixed I am filled with pride and happiness." (Figure 13).

Participant 17 helped his mother by fixing the cable connection of the lampshade. He expressed his feelings of pleasure as he had such a skill of fixing, accomplished the task and helped his mother (Figure 14).

- **Environmental Concerns**

Environmental concerns are amongst the motivations that encourage participants to repair products. Most of the participants are aware of the damage current economic system causes to the environment, thus they want to reduce it.

Participant 10 said that he was interested in repairing small appliances (Figure 15) and he wanted to learn more about fixing objects in order to decrease environmental problems, and added: "I came from a background where you, first of all, attempt to repair broken stuff before replacing them."

Participant 17 had his luggage repaired after its wheels broke (Figure 16). Although he complained that it took too much time to find for a repairman to fix it, he said that he was happy about making the right thing for the environment.

Product Repair Barriers

- **Financial/Time/Labour Loss**

Users decide whether to get the product repaired or not by calculating their loss or gain in terms of time, money and labour.

Participant 6 reported that he did not prefer to have his kettle repaired because he thought it would cost more than buying a new one (Figure 17).

Participant 13 said she did not have her camera repaired because of financial reasons. She stated that the flash of her camera had problems, which did not steadily appear (Figure 18).

- **Condition of the Product (Old/Low Quality/Technologically Out-dated)**

Condition of the product category (old/low quality/technologically out-dated) refers to the state when a product becomes old, unfashionable and stays behind the technology, loses the identity and status once it had. If the products fail to satisfy the human search for new experiences, they become despised (Chapman, 2009). Finally, the relationship between the user and the object fails and leads to disposal.

Participant 18 stated that he did not want to have his mobile phone repaired as he had a more technologically advanced one (Figure 19).

Participant 11 stated that she would not have her shoe repaired since she thought it is old and reached the end of its life (Figure 20).

- **Unavailability of Spare Parts**

Currently most repair processes actually take place as replacement of product parts. This fact makes the unavailability of spare parts among the main drawbacks that participants encounter.

Participant 17 stated that he could not find the spare part because it was not provided by the producer company, as the mobile phone was technologically out-dated (Figure 21).

- **Do not Know How to**

Participants are drawn away from repairing process when they do not have the required knowledge about repairing the product or cannot find someone to repair it.

Participant 6 stated that he tried to repair his mobile phone but he could not due to the lack of correct information (Figure 22). He explained: "I ordered a new screen from China. I thought that it was not so important to wear insulating gloves while fixing, but the phone is now completely dead due to my body electricity."

Participant 1 predicted that the problem of his kettle was loose connection of cables (Figure 23), but he did not have it repaired because he did not know where to take it.

- **Design Related Problems**

Attaching product parts permanently during manufacturing process with methods such as gluing and welding is one of the most prominent design related problems. This increases the cost of repair and amount of waste as functioning parts have to be removed with the broken ones.

Participant 9 complained about the old and worn-out appearance of the product (Figure 24). She wanted to change the outer part but this was not possible because of the way the product was designed.

Participant 1 wanted to have the broken water tank changed but this was not possible as it was permanently attached to the product (Figure 25).

- **Planned Obsolescence**

Participants are discouraged from repairing products if the product is broken more than once. They think the product is produced to last in a pre-determined time and other parts will continue breaking down.

Participant 2 stated that she had the same problem with her last two boots (Figure 26). She had the first one repaired. However, after one week they were torn again. She did not want to repair her newer boots because she thought that they would not last long after repair, like the previous ones.

Participant 10 indicated that he had his loudspeaker repaired twice (Figure 27). He did not want to spend time on taking it to a technical service for the third time because he thought it would break down again. Moreover, he complained about how users are dependent on manufacturers and indicated his desires to be self-sufficient, have the ability and the knowledge about repair.

Types of Repair

Depending on the level of the skill of the person carrying out any of the activities, repair is categorized into three different types.

Assembly repair: This repair type does not require any skill or knowledge. A good example here would be putting product parts together, gluing or binding them.

Medium level repair: This repair type consists of activities which require some level of skill and knowledge like glue knowledge, material knowledge.

Advanced level repair: This repair type includes activities that require advanced skill and knowledge, such as changing the screen of the laptop.

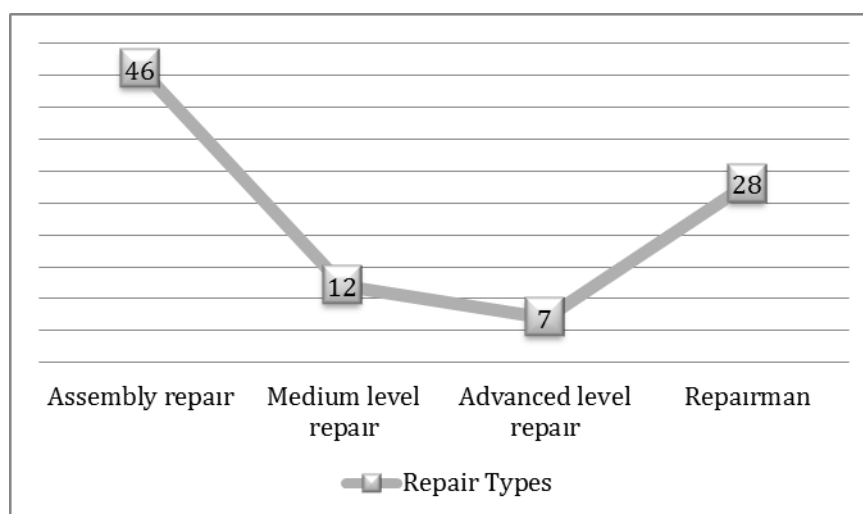


Figure 3: Percentage distribution of repair types

According to the graph (Figure 3) 49% of the processes are assembly repairs and only 7,5 % of them are included in the advanced repair type. This result shows that participants prefer to engage in repair activities which require less knowledge and are easy to complete.

Conclusion

According to the research results, a correspondence between the product repair barriers and major problems of current linear economic system can be seen. Unavailability of spare parts, expensive repairs service, most design related problems and planned obsolescence are widely studied subjects in the literature. Business models of a circular economy that can overcome these major problems have been known since mid-1970s and are currently used in some sectors (Stahel, 2012).

Implications of the results of this research can be used by stakeholders in the circular economy system including designers, researchers, policy makers and companies.

Among the product repair barriers, “Do not know how to” category has a huge potential to be addressed through research and design. Some of the participants indicate that they cannot repair their products because they do not have the required knowledge or they do not know where to take the broken product. Some implications for design can be improving the content of maintenance and repair manuals of products. Moreover, repair kits for products can be developed during the design process considering possible future faults.

Product attachment and behavioural change are studied with their various aspects in the literature. A further research can be done about the effects of product repair on product attachment and behavioural change. It is likely that product repair changes the user disposal behaviour, but there is not research conducted in this area to prove that.

Warranty is one of the categories that motivates users to repair their products. Further research in this subject may result in an increase in product lifespan. Legal sanctions can be taken by policy makers such as extending warranty periods, labels on products to inform users about warranty periods and lifetime warranty.

To conclude, this research has shown that the act of repair is not only limited to fixing faults, but also it is a generative process that is motivated by complex emotional drivers and behavioural aspects. It gives a sense of accomplishment, teaches how things are made and informs about their material qualities. The insights raised from this study can be applied to explore these various dimensions of product repair.



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9

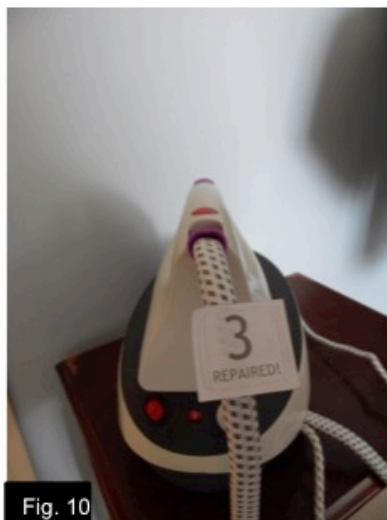


Fig. 10



Fig. 11



Fig. 12



Fig. 13

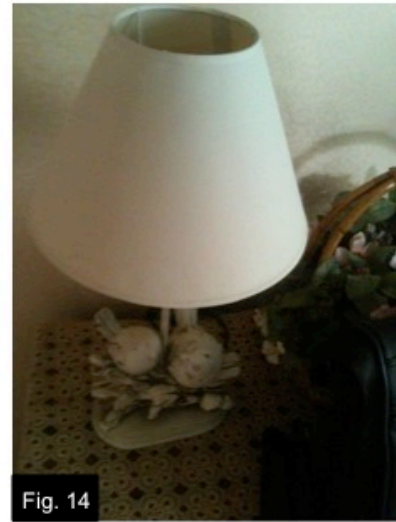


Fig. 14



Fig. 15



Fig. 16



Fig. 17



Fig. 18



Fig. 19



Fig. 20



Fig. 21



Fig. 22



Fig. 23



Fig. 24



Fig. 25



Fig. 26



Fig. 27

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