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This document is the Published Version [VoR]

**Citation:**

YOUNG, Gordon (2017). Taking good care: investigating consumer attitudes product maintenance. In: BAKKER, Conny and MUGGE, Ruth, (eds.) Proceedings of the Product Lifetimes and the Environment conference, PLATE 2017. Research in Design series (9). IOS Press, 442-445. [Book Section]

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## Taking good care: investigating consumer attitudes to product maintenance

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### Keywords

Maintenance  
Care practices  
Product  
Consumer

### Abstract

Building on the work undertaken in the 'Caring Project' (Gwilt, Leaver, Fisher, Young, 2015), this secondary inquiry seeks to ascertain specific aspects of maintenance practices that are employed by users and to understand the drivers behind some of the key decisions taken when maintaining products. Through an empirical study that involved gathering data using methods including a survey, observations and cultural probes, the findings reveal some of the motivations behind the choices of those who self-maintain and those who choose to have that work carried out by a service provider. Moreover some insight into the prompts that trigger why users instigate product maintenance, and the equipment selected and used in the maintenance of common objects are also discussed. These initial insights support the potential for a larger study with the ultimate aim of influencing designers and manufacturers in the development of longer lasting products.

### Introduction

It is widely accepted that extending the lifespan of consumer products is desirable and can make a significant contribution towards slower consumption, therefore reducing the impact of consumerism on the environment (Cooper, 2005). Amongst many strategies and approaches that can be used to extend the life of products, there is recognition that many types of product require regular maintenance to keep them functioning at their optimum performance and to prolong their useful life. In some cases, this maintenance is intended to prevent catastrophic failure, such as in aircraft or motor vehicles, and strict maintenance schedules exist with regulations to ensure that these are adhered to. In other cases regular maintenance can extend the time by which a product is seen as desirable. There are also many examples of products that would benefit from regular maintenance to maintain optimum performance characteristics and to extend the product lifespan, but where the imperative associated with potential catastrophic failure does not exist.

The European Union has taken steps towards providing a regulatory framework in the Ecodesign Directive that currently requires manufacturers to supply information for consumers on how to maintain a product in order to maximise its lifespan and to minimise its impact on the environment. It also requires that manufacturers consider maintenance and the availability of spare parts at the design stage (European Parliament, 2009). Providing consumers with guidance and considering maintenance during the design stage of a product can go some way

towards sharing the responsibility of optimal product lifespan as it is accepted that the lifespan of a product is affected by the day-to-day treatment that it receives (Cox, Griffith, Giorgi, & King, 2013). For this to be effective in extending product lifespan it is important to understand users attitudes towards maintenance; the drivers and barriers that may exist; as this could aid the design of products, systems and information that encourage correct maintenance practice.

### The 'Taking good care' project

Insights gained from a previous study (Gwilt, Leaver, Fisher & Young, 2015) indicate that there is much to understand about the drivers and barriers that influence consumers' motivation to carry out maintenance on the products that they own or use. It was also clear that there are a diverse range of products that benefit from regular maintenance to ensure optimal performance and durability. In light of the gap in knowledge concerning the maintenance practices of users the 'Taking Good Care of Things' project was developed to reveal insights that can support designers, manufacturers and consumers to engage in practices that promote extended product lifespan. This work in progress contributes to a growing body of work and is intended to inform further studies.

### Methods

For this preliminary study, qualitative and quantitative methods were employed with the aim of revealing insights into the maintenance practices of users, the motivations to conduct maintenance and the tools or services employed to that end.

In order to understand the breadth of opportunity for study that this area represents, in this first phase of the work cultural probes (Gaver, Dunne & Pacenti. 1999), in the form of a 'field kit', were distributed to a small group of users who were identified through established networks and were known to own one of a diverse range of products that may benefit some form of maintenance. The cultural probe field kits contained a single use camera, blank postcards, graph paper to produce a map and a notebook to act as a journal or diary. On each item in the kit was a short written prompt asking the recipient to record specific aspects of their maintenance activity. Five kits were distributed to users who, between them, owned a vintage sewing machine (participant 1), a mountain bicycle (participant 2), a banjo (participant 3), a collection of road bicycles (participant 4) and horse riding equipment (participant 5). The information returned in the completed kits contained materials that point to a rich source of opportunities for further research and in this case informed the next phase of this study.

In the second phase the information gathered from the cultural probes were analysed and a set of questions emerged to form the basis of a survey. This consisted of a self-completion, online survey that posed a series of initial questions, which led respondents on to further appropriate related questions. 42 male and female respondents who represented a range of adult age groups completed the survey. The survey was designed to discover the reasons why some users undertake maintenance themselves and some choose to have all or some of this undertaken by others. Furthermore, it set out to discover if there was a difference in the prompts that trigger the maintenance activity between these two groups. Finally, the survey asked questions about the tools and other equipment use during the maintenance procedures.

## Findings

### *Cultural Probe*

Participants returned the cultural probe field kits after a week of use. Whilst the probes are not intended to be formally analysed and are to be considered as a means of providing initial insight and direction for this study (Gaver, et al. 1999) there are some key themes that emerged from the material gathered during this exercise.

Maintenance as an extension of the activity associated with the product was a common theme linking all of the participants as regular maintenance directly preceded or followed use in all cases. Participant 2, The mountain biker, is a good example of this; he thoroughly cleaned and lubricated his bike after every off-road ride. Equally, the horse rider cleaned and oiled the riding equipment after every outing. Alongside this regular maintenance that is directly linked to the use of the product, most participants reported additional occasions when longer, more thorough maintenance sessions took place that were not linked to immediate use. Participant 1's vintage sewing machine was maintained 2 or 3 times a week when in use, then was thoroughly cleaned twice a month.

All participants reported and produced maps that described specific dedicated locations where the care and maintenance was carried out and identified that tools and equipment necessary for the task were stored nearby. In most cases a combination of specialist tools and equipment were used alongside general tools and appropriated household materials. In some cases users had manufactured their own specialist tools or equipment to suit their own circumstances.

All participants reported that they used a variety of sources to inform their maintenance practice. These included instructions that were supplied with the product; maintenance and repair manuals bought separately, websites, online video content and knowledge handed down from friends or relatives.

### Survey

In analysing the data gathered through the online survey respondents had to declare and describe the maintenance practices regularly employed when caring for a product in regular use. The majority of respondents identified an item on which the remainder of the questions were then based. Initially 2 respondents felt that there was nothing that they could reflect on, which required regular maintenance, but when informed that maintenance could include making adjustments, cleaning and caring for materials, they identified a product that they owned or used.

### *Who maintains and why?*

Of the 42 respondents, 48% stated that they completed all of the maintenance themselves, 40% employ a combination approach where they personally undertake some maintenance work but selected tasks are deployed to others, and 12% have all of the maintenance carried out by someone else. The different motivations underlying the choices of how to have maintenance undertaken were then explored.

When asked 'Why do you choose to do all or some of the maintenance yourself', respondents were prompted to choose multiple answers from a number of options. Of those who stated that they undertake all of the maintenance, 70% agreed that the reason for this was that they enjoyed the activity, 60% agreed that it was to ensure that the work was completed to their 'high standards', and 50% agreed that they did this to save money. By contrast, the respondents who stated that they undertake some of the maintenance, but have some carried out by others identified with a different set of key motivations. 53% agreed that they chose to do some of the work themselves as it needed doing often and 41% agreed they did it to save money.

Those who initially identified that they choose to have all or some of the maintenance carried out by someone else (22 of the 42 respondents) were given a number of options to choose from to describe why this was the case. 82% agreed with the statement: 'The work requires specialist knowledge that I don't have.' and 45% with 'The work

requires specialist facilities that I don't have."

### Prompts and triggers

After beginning to identify the reasons for conducting maintenance it follows that there is merit in understanding the triggers that prompt users to initiate maintenance procedures. The two groups: those who do all and those who do some or none, were asked, "What prompts you to carry out the maintenance?". Of those who indicated that they undertook all of the maintenance, 60% agreed that this formed part of a regular routine, 40% agreed that there was an indication from the product and 30% that they followed guidelines that were supplied with the product. The group who identified that they have all or some of the maintenance carried out for them chose the same top three statements, but assigned a different value to them. 77% of this group agreed that it was an indication from the product, 32% agreed that they were following guidelines and only 18% agreed that this was part of a regular routine.

### Motivations for maintenance

In order to explore the motivations experienced by users to ensure that the products owned and used are well maintained, all respondents were asked to rate a series of five statements in terms of how relevant they were to them. Users could select a rating from 0 to 10, with 10 being identified as most relevant and 0 as not relevant at all. The average score for each statement was then calculated to give an indication of the perceived relevance of the statements.

Of these statements, three achieved average scores above 8, the highest scoring statements were:

*"I carry out the maintenance to make my product last a long time"*, (average score 8.74) with 50% of all respondents rating this as 10, most relevant.

*"I carry out the maintenance to ensure safe operation"*, (average score 8.67) with 52% of respondents rating this as 10, most relevant.

*"I carry out the maintenance to keep my product performing at its best"*, (average score 8.4) with 38% respondents rating this as 10, most relevant.

The further two statements:

*"I carry out the maintenance to keep my product looking good"* and *"I carry out the maintenance to ensure my product keeps its value"*, scored 6.17 and 6.38 respectively.

### Knowledge and equipment

The cultural probes that formed the initial exploratory stage of this investigation indicated that a variety of sources were used to learn how to maintain products. They also indicated that users kept a range of specialist and more general tools and products with which to carry out the tasks.

All respondents were asked, "How did you learn to do this maintenance?" and they could choose as many of the possible answers as were relevant. Results were relatively evenly spread across this category, with the most popular response being a manual supplied with the product as their main source of information, 40% chose this option, followed by being taught by a relative where 36% chose this option.

When asked to indicate which type of item was used for maintenance, 69% of respondents identified both general tools and specialist tools. Lubricants were also commonly used with 63% selecting this option. Of these items, 80% of respondents identified that they bought the tools or equipment specifically for this purpose and 54% stated that they already had this equipment at home.

### Conclusions

Maintenance is accepted as a key topic for product design in a circular economy model (van den Berg & Bakker, 2015) and the roles of manufacturers, service providers and the consumer in making products last longer have been considered for some time (Hinte, 2004). Changing the relationship between the manufacturer and consumer from that of a short transaction based model to a longer lasting sale and service relationship is seen as a positive model to encourage product life extension (Chapman, 2005). In uncovering attitudes to maintenance, the drivers and barriers that exist can provide product designers with a better understanding of how to develop products that encourage maintenance and care, thus extending the lifespan of the product and maintaining optimum performance over a longer period of time.

Material gathered through the cultural probes provided a basis for this enquiry whilst also generating insights that can help to understand this complex issue. The probes indicate that regular maintenance of products linked to a specific activity is often carried out as an extension of that activity. In this case the products examined were linked to a leisure activity and it may be the case that the user considers the maintenance as an integral part of that activity. This is supported with evidence from the survey that indicates that the strongest motivation for those who choose to carry out maintenance by themselves was enjoyment of the task itself. This group also indicated that the maintenance they chose to undertake formed part of a regular routine. By contrast, the strongest motivations identified by the group who only do some of the maintenance themselves were more strongly associated with a regular need and cost saving. It follows that there is a case for promoting user maintenance by embedding this action within the routine use-cycle of the product.

The need for specialist knowledge and equipment were considered the strongest barriers to user maintenance, however there is evidence that users are prepared to purchase equipment and use a variety of information sources specifically to support this activity. Removing the need or the perception that there is need for specialist

knowledge and equipment may encourage the reluctance to engage in care practices that support extended product lifespan.

As maintenance is generally most effective when applied at the correct interval, understanding the triggers that engage users to initiate maintenance is important. All users identified that an indication from the product was a significant factor, but this must be considered further as it is not clear if this is as a result of a specific service indicator, or a more subtle form derived from the users intimate understanding of the characteristics exhibited by the product during use.

Whilst it is encouraging to observe that the motivation to keep products well maintained is most strongly associated with longer product lifespan and optimal product performance, it is acknowledged that this is a preliminary study and this subject warrants further investigation.

### Acknowledgments

This project was funded by the Art and Design Research Centre (ADRC), Sheffield Hallam University.

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