PLATE conference
Delft University of Technology
8-10 November 2017

PLATE
Product Lifetimes And The Environment

Operationalizing contextmapping as a means for increment of product durability in kitchen utensils design

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Keywords

Participatory design
Contextmapping
Product durability
Kitchen
Utensils

Abstract

Increasing products lifespan is a strategy for a greener and more sustainable future. From a societal vantage point, disposing or discarding products results into consumerism with mountains of waste. Kitchen utensils, regarding their high frequency of usage, are not exceptions of this matter and their design, alongside with their material quality, specify their longevity factor. User-product interaction plays a major role for the design of products which would last longer, whether emotionally or functionally. There are many products which due to poor physical interaction design, destined to breakage, disposal or discardment. In this study, one of the popular tools in participatory design was used to elicit firstly, deep layers of user-product interaction in an authentic environment (like daily routine life), and secondly evaluate the possibility of engaging users in the design process for this rubric. Contextmapping is originally developed to discover latent needs and tacit knowledge of users and in this study, with minor modifications derived from semiotics, context mapping with the goals of product durability was used to find its viability in user-product interaction and glean design principles on product longevity from an actual product-user.

Introduction

Today's society approach has inclined towards disposing and generating waste. Durable products proved to be a successful plan for a sustainable future (Ossevoort, 2010). As materials and physical quality play major factors for product life span (Fuad-luke, 2010) product designers are considered very potential for designing durable goods. The influence that designers can have on a product's life span has been studied by numerous authors (Chapman, 2012; van Nes & Cramer, 2005). Furthermore, the factors that can have impact on the end of a product's life, are varied. Including physicality, perception and performance (Ossevoort, 2010; Packard, 1963; Shedroff, 2009; Walker, 2006), in which the user may dispose of the product or stop using it. Kitchen utensils, due to their high frequency of use (Brooks, 2004), are likely to get out of the usage process, caused by either breakage or simply becoming inoperable. A short survey on these users done by the authors, showed the high amount of disposability and obsolescence in kitchen utensils; mainly because of the inoperability and difficulties users had to cope with. Eliciting their context-of-use may be a promising solution in order to shed a light on kitchen utensils disposability. Accordingly, on account of overlapping studies on participatory design and sustainability (Cramer, 2011), Contextmapping was elected to elucidate the context of use in kitchen utensils i.e. in order to discover the context and also make the users co-designers for the process team. The main hypothesis is that Contextmapping can be a good tool to improve product durability. The research question is whether those tools can be used directly or some changes might be needed in order to align them with durability goals. The study was designed in order to reach these goals. The secondary hypothesis was that if modifications of context-mapping tools through semiotics can enrich the possible results from using such tools or not.

Mapping the Context

Designers' knowledge and their experience can't always cover the scope of users' knowledge. What users experience throughout their lives and the knowledge they gain by interacting with different objects makes a model in their minds, which Norman calls 'mental models' (Norman, 1988). Usually users' mental models differ with the designers' and because of this matchlessness, products would be used wrong, which lead to errors in user-product interaction and consequently results in discarding the product. Contextmapping has been introduced as a tool to elicit tacit knowledge and latent needs of users by firstly make them sensitive about their daily experiences and let them engage into the design process as co-designers (Visser, Stappers, van der Lugt, & Sanders, 2005). The process consists of users making designerly artefacts like collage, models and drawings in order to express their experience and let designers access them (P. Stappers, Sleeswijk-Visser, & Keller, 2003). Contextmapping studies are often used in elicitation of cultural, societal and experiential context of user-product interaction (Chamorro-koc, Popovic, & Emmison, 2007).

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Human-product interaction does consist of another realm of physical interaction (Chamorro-Koc & Popovic, 2008) which relates to the issue of users' understanding of product and how to interact with it. Product semantics (Kannengiesser & Gero, 2010; Krippendorff, 2005), Affordances (Kannengiesser & Gero, 2010; Srivastava & Shu, 2013; Turner, 2005) and Information-for-use (Frens, 2007), which connects directly to all human skills (perceptual-motor, emotional and cognitive skills), all are related to the users' experience and thus is inextricably connected to the context-of-use. It is hypothesized that by using the robustness of this tool, designers might be able to extract and elicit issues of physical interactions of users on the first step and then engage users in the process of design in order to evaluate their ability of generating ideas.

Materials & Methods

For the study, based on the principles of Contextmapping guides (Esser, 2017; Sanders & Stappers, 2012; P. J. Stappers, 2010; P. J. Stappers & Sanders, 2003; Stappers P.J., 2006; Visser et al., 2005), the number of participants, type of sessions, stages, objects, tasks and methods were defined.

Utensils

As of the time of this study and regarding the skills of homemakers who partook in it, 14 utensils were elected. None of the utensils were powered (gas, steam or electric) and they were consisted of mechanical and non-mechanical parts. It was desired to choose types of utensils which not only require users to "grab" and "hold" it but also offer the fewest amount of visual information like signs, arrows or text labels. Other factors of assortment were the saliency of the tools; whether they are used routinely or not, and moreover, the amount of discardment (disposing/junking) of the utensils. Some of the ordinary items like spoons or ladles can mostly be repaired and reused, as it was stated by participants. The list consisted of: a) Can Opener, b) Kitchen Shear, c) Sifter, d) Chef Knife, e) Vegetable Peeler, f) Grater, g) Skillet/ Fry Pan, h) Saucepan, i) Colander, j) Nut Cracker, k) Mechanical Ice-Cream Scoop, l) Hand Juicer, m) Teapot[1] , n) Samovar (a tea urn for hot water/kettle). Users were not limited to interact with a specific type or brand of utensils and could use arbitrarily.

Participants

Homemakers who usually spend a considerable amount of daytime in the kitchen are mostly women. Therefore, 15 participants, ranging from 35 to 65 y/o, who were chosen randomly, were females, albeit they could obtain the aid of their family or siblings during the study. All the volunteers were housewives and none were employed in any form of vocational work, neither part-time nor full-time.

The number of participants was chosen based on principles of Contextmapping concerning higher numbers of participants might conclude to imprecise and perplexing results.

Probes & Guidelines

Contextmapping includes different stages, including three main phases: Preparing, Collecting and Communicating (Esser, 2017). Some Alternations were made to the probes, as the essence of Contextmapping probes are usually for cultural, societal and experiential rather than physical interaction. The aim of probes was to sensitize participants about the issues that hinder proper and complete interaction. Issues that generally result to breakage, destruction, ruination or make the artefact "inoperable". On this account, the probes which developed were mostly recording ethnographic tools of participants' daily tasks with the specified utensils. That being so, developed probes ought to elicit objective interaction in an authentic and unfeigned environment (such as daily normal life in a house) rather than in a simulated one (in research laboratories). A map, developed by authors, can clarify the scope of objective interactions to be discovered in the authentic environment; furthermore, the study of physical interaction is in the realm of objective interactions and a real environment shown in the figure as a blank area (Figure 1).

A guideline in a form of pamphlet was designed explaining the tasks and tools participants should put into actions, then a group was created on Telegram Messenger™ (because of its popularity in Iran) for further contact and support. All Participants were added to the group
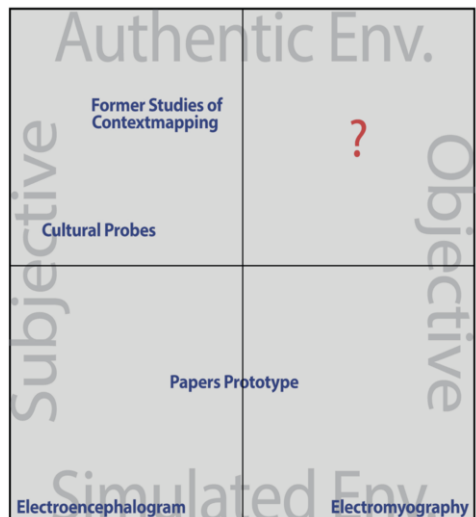

Figure 1. Biaxial map Depicting the scopes of research methods for subjective and objective interactions in different environments.

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[1] Teapot is hardly considered as a "utensil", but like fry pans or pots, it's a culinary-related container; Due to the habitual usage of teapots for making tea (usually 3 times a day) in Persian culture, teapot was also included.

[2] 'Elder notes' is a technique developed by the authors of this study founded on "Narrative Structure in Semantics & Semiotics".

including authors, and the guideline was uploaded to the group alongside with the printed version which handed to them.

Probes that were used in the study were video diaries (Brown, Costley, Friend, & Varey, 2010), Photo Analogy and Elders' Notes[2] (Trifonas, 2015). Each one comprehensively was explained in the guideline.

The Procedure of Study

The study was conducted for two months. Firstly, a short ethnographic survey was executed to acquire details about the problems in interaction of kitchen utensils. The method was gathering verbal protocols of participants indicating the reasons for discardment.

After the survey, probes and guidelines were prepared for succeeding stages. Participants had 3 weeks to be sensitized, also they were assigned to use the three probes i.e. gather their interactions and notes, record and capture them and share them in the Messenger Group (Fig. 2 and 3).

Sensitization

During this phase, they were supposed to use their mobile phones or a camcorder to record videos at home; meaning without any interruptions, cuts or transitions. Videos should have taken 5 to 7 minutes and participants were allowed to send their experience with the video diaries in the form of short footages. In these 3 weeks, they reflected their comments and ideas upon the issues of the utensils; apropos of their lifespan and durability. Each of them has worked and interacted during their real and genuine culinary processes; in other words, they collected and submitted their experiences of interaction, when doing routine and regularly tasks of life, which yielded original results due to the habits and knowledge they had about using kitchen utensils. The questions about the procedure

and germane subjects were all answered by authors; but inquiries about the "way" a utensil should be used were evaded by instructing them to "use their own discretion".

In addition to videos and photographs, participants submitted comments about the elder notes. These notes were all the tips and tricks of using utensils by their parents or elder relatives. Some of the participants were elders and they had their own hints of using utensils; but others collected these notes out of scribbles on the side of a cooking book or recipes, observing how the elders use a specific utensil or by asking them. All data were saved and stored.

Session

After the sensitizing phase, a generative session was set to be held at university of Tehran. Participants were given two set of techniques; containing collaging and mindmapping. The session was recorded by a camcorder and a mobile phone (sound recording), lasting for about 5 hours (Fig. 4 & 5). The participants then started using techniques to express their experiences and their ideas about the kitchen utensils. The technique for collages was inspired from Synchronic and Diachronic arrangement, generated from semiotics (Chandler, 2007). Participants were free to change the elements of the kitchen utensils (such as handles, body, materials and etc.) based on the choices given to them (that is what is meant by synchronic). As an example, in the potato peeler by OXO (Hustwit, 2009), designers found out that bicycle handles are more comfortable for users than ordinary peelers' handles. We interpreted such a creativity story through diachronic and synchronic technique. The collage phase consisted of outlined pictures of utensils without textures or colors, and 60 pictures of different visual references; e.g. different types of grips in tools, instruments, transportation vehicles; joints like Lego Bricks™, mountain climbing gears, industrial components, faucets, chains, etcetera.
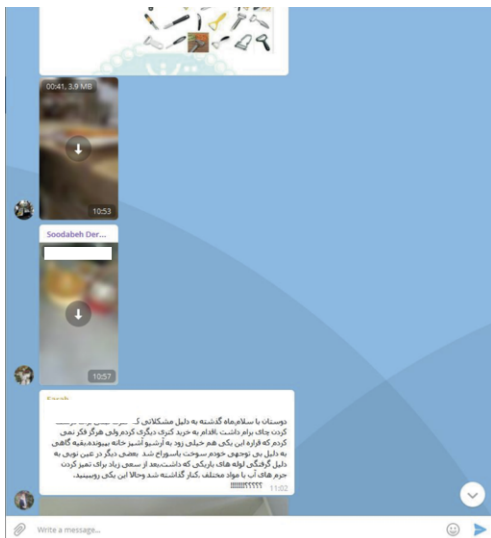

Figure 2 & 3. Screenshot of the Messenger Group showing participants response in the form of Videos, Photographs, and texts.

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Figure 4. Participants discussing and sharing their comments about their artefacts.

The mindmapping phase followed the same strategy, but participants used words and links to express their ideas and experiences.

Results

After finishing each stage of the Contextmapping procedure, notable and significant results have emerged. In the sensitization phase, participants noticed varied problems in utensils; they indicated that apropos of errors, difficulties in interacting and troubles when working, they had decided to discard the product. Consequently, problems were categorized in 4 main concerns: changeability, learnability, functionality, and facility.

Changeability

Nearly all participants had problems with the can opener, peeler, samovar, shear, nut cracker and scoop due to the lack of changeability of their components. The reasons which were stated were disfigurement or being spoiled because of usage, in which participants tend to change a specific part of the product with a spare part. Notable product was samovar/kettle which the tap usually clogs because of sedimentation. The lack of changeability of the tap was resulted to 4 samovars going to junks (an elder participant's comment). Another example was the blade of the peeler which 4 of participants explicitly commented in the group; they were unable to change the blade when it became dull.

Figure 5. The generative session with participants. Each participant had a specific amount of time to share her insights with others.

Learnability

Participants had many problems with using some of the utensils for the first time. Comments revealed for can opener, scoop, nut cracker and hand juicer that they wanted a leaflet for the purpose of the utensil and how to work with it. This issue was noted while participants mentioned the form and shape of the utensils are lucid and almost inviting to interact. Other utensils like sifter, grater, pans, shears and knives were mentioned neutral.

Functionality

All volunteers stated that their decision for a utensil whose functionality has been limited, is discardment. One of the elders noted: "I'd repair some of simple ones like a sifter or a grater; but I'd prefer to buy a new one". Functionality was approximately the most remarkable hindrance for durability, as by any means which leads to malfunction will mostly end up in disposing; whether its new or not. In fact, functionality in participants' view surpasses aesthetics and beauty of the product. Problems with functionally were mostly derived from the design of the utensils rather the material quality. Although appearance of the utensils had forced participants to choose products that showed less aging (e.g. black pans rather than red pans), they preferred to own a durable and functional product than an appealing one.

Facility

An easy to use utensil was the most coveted item among the comments of participants. Alongside with functionality, volunteers stated that a complex-looking utensil mostly dissuade them to buy or use it. Facileness was a parameter which in the absence of it, made participants to junk utensils in the drawers, cabinets or the storage.

Made Artefacts

Using the two techniques, participants had the chance to showcase their designerly made objects. They were given scissors and glue pens for the collage phase, and papers and pens for mindmapping. They made artefacts which were innovative, each one specifically derived from their own problems. They used pictures of various industrial components to sort out their personal problem. After sharing their work in the session, other members found the artefacts promising and attractive for the stated problem; meaning, although the artefacts were created on personal problems, it inclusively answered the needs of other participants. "I wish all other graters in the market were like the one you made" one of the elder volunteers mentioned about a grater made by a member. The greater was equipped by window hinges, concerning the angle participants preferred to give to the grater (Fig 6).

Another example was the colander, which was created based on explanations around the artwork in a text format. The participant wanted to have a flexible colander with a firm base, so she could shape it and guide the contents to the pot facilely (Fig. 7).
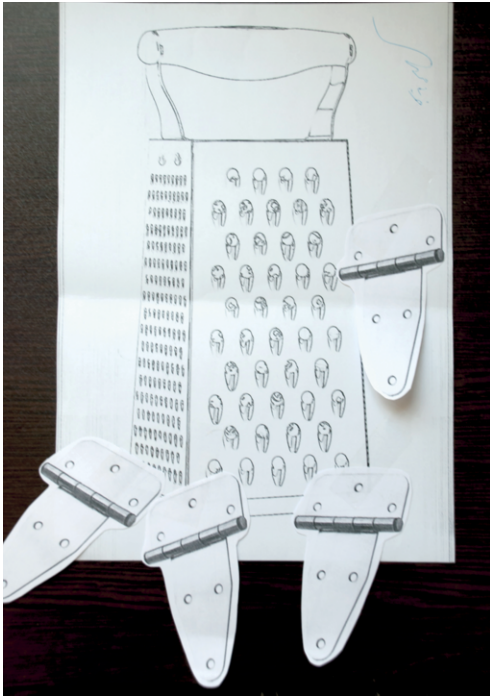
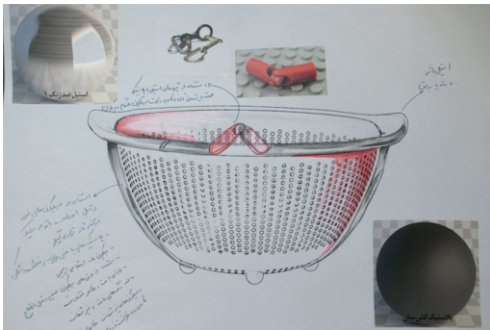*Figure 6. The grater geared with hinged for the angle participant wanted.*

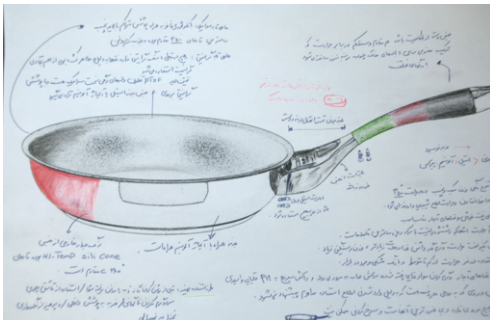*Figure 7. The Colander was chosen by authors but the user added texts about the artefact.*

Figure 8. The pan with the defined details about the magnet handle.

A pan with a detachable magnetic handle with was one of the eye-catching artefacts. The user had added a button to detach the magnet so the pan can be released of the handle. This idea was generated based on the frying pans with burnt handles; and the participants had disposed them (Fig. 8).

Conclusion

According to the hypotheses, Contextmapping was fruitful in the study. However, the question was whether these techniques need any modifications for understanding product durability or not. On that account, two refined techniques were generated that were used in the session, collaging and mindmapping. Both were using synchronic and diachronic axes i.e. possible exchanges were offered to participants. The results showed that context mapping did need modifications but the essence of this tool answered the goals of the study.

Another prominent outcome of the study was the principles they suggested for designers. So Contextmapping factually availed the participants for design ideas on durability and product longevity. They implicitly used innoduction (Innovative Abduction) logic for idea generation; it can be concluded that semiotics for product durability could be a method for further research.

Ultimately this tool for eliciting issues and problems for designing durable products is still at its infancy. Participatory design has far more approaches to offer for sustainable product/behavior design and design researchers have yet to discover them.

Acknowledgement

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