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Understanding long lasting design through tangible tokens

Ayşegül Özçelik[(a)], Markus Löchtefeld[(a)] & Christian Tollestrup, [(a)]
a) Aalborg University, Aalborg, Denmark

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Abstract: This paper presents the development of new interview tools to conduct interviews by incorporating physical tokens embedded with concepts related to product longevity. The objective is to augment the depth and quality of qualitative interview data in the field of longevity and sustainability studies.

Subtitle/ Introduction

Longevity is one of the prevalent concepts among many in the design for sustainability literature (Ceschin & Gaziulusoy, 2016). It claims that keeping the product in use may decrease the need for new production, thereby decreasing the environmental impact. The concept of circular economy (Ellen MacArthur Foundation, 2013) argues to protect the product's value until its end of life and create several loops before the product goes out of the cycle. When aiming for longevity, we focus on the product's use, maintenance, repair, exchange, recycling and disposal phases and related concepts.

When products involve integrated digital technologies, the longevity of the product becomes a more complicated issue. Discussing longevity and going beyond the surface level, particularly when gathering data regarding lifetime and sustainability of products, can be difficult when working with industry informants due to their wish for a positive perception of their products. Furthermore, while some of the academic longevity concepts are widely used in the industry with increasing interest in long-lasting and sustainable products, the terminology might differ.

In our work, we focus particularly on connected products (Raff et al., 2020), which are known for having a high use and disposal rate. We conducted semi-structured interviews with design practitioners from industry to understand how they approach longevity in their work. To support these semi-structured interviews, we designed a simple toolkit including tangible tokens that served as prompts and triggers for discussion with participants. The design of the toolkit began with a grounding in previous literature review studies. We developed a set of physical tokens with shapes according to key themes and inscriptions from key concepts in the sustainable ICT and design for sustainability literature.

We present the reflections of interviews with 12 participants and highlight the advantages and disadvantages of utilizing tangible tokens during semi-structured interviews.

Tangible tools

Donald Schon gives a familiar example from daily life to exemplify the knowing-in-action: *"a touch-typist, who cannot say offhand just where all the letters are located on the keyboard, can begin to type, even on an imaginary keyboard, and thereby find the "T" just underneath the second finger of the left hand, the "L" just underneath the fourth finger of the right hand, and so on"* (Schon, 1983, pp54) He proposes that design knowledge can be exposed in doing (Schon, 1983). In line with this perspective, tangible tools initiate actions; therefore, participants may reflect on meanings, assumptions, and new solutions, which can enrich qualitative data during interviews (Buur, 2018). Supporting conversations with such tangible tools can help researchers gain deeper insights into the implicit level (Sanders & Strappers, 2012) of understanding of the interviewee.

In participatory design, one of the key aspects is that the researcher takes on the role of a facilitator, assisting the participant in articulating and expressing their experiences while minimizing bias as much as possible. There are three main approaches to elicit

information and obtain creative data in participatory design practices such as probes, generative toolkits and prototypes. While probes (Sanders & Strappers, 2014) are used to elicit a response, they help participants reflect on their ideas, feelings, and experiences. Similarly, generative toolkits are commonly utilized in facilitated collaborative activities and can be used to make artifacts to explore the problem or imagine the future (Sanders & Strappers, 2014). Furthermore, the resulting products and descriptions can be examined to get an understanding and empathize with the user (Sanders & Strappers, 2014). Prototypes are used to represent ideas and concepts to receive feedback about the emerging design (Sanders & Strappers, 2014). In this paper, we follow up on these ideas and extend them to gather data in qualitative semi-structured interviews. For this, we introduce a toolkit developed based on longevity concepts derived from a literature review study.

Methodology

After multiple iterations, the tangible tokens have been tested in 12 semi-structured interviews with designers and sustainability experts of audio companies that produce connected speakers, headphones, and earbuds. The method is utilized in the last third of a 90-minute semi-structured interview. The interviews were recorded and partly transcribed. The researcher's observations and reflections after the interview sessions were the main information source.

Figure 1. Tangible tokens.

The first author of the study created the tangible tokens based on the framework presented in a previous study (Özcelik et al., 2022) that outlines existing concepts of product longevity in literature. In an initial test interview, we used paper mock-ups of the tangible tokens together with a drawing of one of the company's products to assess how well the participant grasped the concepts. After asking all initial questions, we showed three groups of codes and asked the participants which codes were related to their approach and how they impacted their work with examples. However, it became clear that the paper material and the drawings of the product did not work as we had hoped. The participants preferred to answer and discuss based on the real product rather than pictures of it or its components. However, the different longevity concepts broadened the discussions, and the participant brought more examples and insights having the stimulation of the tangible codes. For the final version we decided to produce codes on tokens made from MDF using a laser cutter (as can be seen in Figure 1). The longevity concepts are grouped into three main categories: design-related codes, software-related codes, and hardware-related codes and additionally another minor category: others. For each of these we used a different shape, the complete list of all used codes can be found in the table in the Appendix. Overall, the main objective was to present a range of concepts and to engage the participants as much as possible. These where then used in 12 semi-structured interviews. We present reflections based on these interviews below.

Findings

Discussing the complexity

Smart products have complex characteristics, particularly when viewed through the lens of longevity. They consist of identical components that are codependent on each other, requiring different approaches to ensure longevity. Discussing this complexity with participants can be challenging, but the use of tangible tokens has proven helpful in managing it. By presenting each category in the order of software, hardware, and product design, we were able to discuss the three layers of the product on equal footing.

In the interview conducted with the product designer from Company A, a medium-sized company, extensive discussions revolved around the product design-related codes, as the expertise of another individual who could address the software and hardware aspects was not included in the interview.

Consequently, the participant provided fewer details concerning the software and hardware elements compared to the product design-related codes. Conversely, in the case of Company B, a small-scale company, the interviewed participant held the dual roles of designer and company owner. Thus, being involved in design, software, and hardware matters, the participant was capable of presenting multiple examples and providing comprehensive explanations regarding all elements.

Having three main categories simplified the discussions. During the study, we noticed that discussing codes related to product design provided more insights compared to other categories. The relevance of this observation depended on the characteristics of the company and the level of responsibility of the participant.

Stimulating the minds of participant

Giving the material and using them as an elicitation technique, is described as "giving the pen to the participant" which releases some of the control over data (Sorensen et al., 2022). By giving participants more control over the data, researchers can increase the richness of the data and create a space for hands-on interaction with abstract concepts, leading to deeper reflections (Conrad, 2015).

Similarly, opening the conversations up and stimulating the participant to think was needed. Creating tangible tokens helped to stimulate participants to provide more specific and concrete examples regarding the various longevity concepts in three categories. In the interviews, we observed that more examples were brought forward by the participants during the tangible token part. As some participants preferred online interviews, we created a digital version of the tool in Miro. However, based on the researcher's observations, the physical version worked better and stimulated more reflections. In future studies, more space for the participant could also be created by providing empty tokens that they could fill themselves.

Clarifying the framework of the study

Even though longevity is a broad framework, there is a tendency to focus solely on particular longevity concepts, such as durability, quality, and robustness, and some sustainability concepts, such as recycled material, recycling, and carbon emission. Transferring the high variety of the concepts derived from the literature to the interviews helped researchers broaden the discussions and clarify the framework. Since our physical tokens are derived from the longevity literature, they might also in the future help researchers to compare academic and industry knowledge. It might allow us to go into detail about how companies apply academic concepts. Most significantly, it shows the line between academy and industry.

Flexibility of the meanings

Understanding the participant's point of view better reduces the researcher's bias and creates an opportunity to check how the concepts are used in an industry context. Tangible tokens, similar to card sorting activities (see Conrad, 2015), can be used in the semi-structured interview to increase shared understanding and reduce researcher bias, thereby decreasing misunderstandings.
Use of terminology was the biggest concern before starting the study, as longevity, sustainability, and circular economy are popular topics that can often be used with different meanings than those found in literature. We provided the longevity concepts to the participants without explanations and left the codes open to interpretation. The researcher only intervened if the participants asked about the codes' meaning. This approach made the participants' perceptions, meanings, and values explicit. Sometimes the concept was perceived differently than in the literature, but we did not interrupt the participants unless they asked for clarification, allowing them to attribute meaning. The following interview excerpt shows how researchers answered to the participant with the concern of impacting the participant.

Participant: *"Product, service and system, what could it be?" [participant takes the code and asks]*
Researcher: *"You have the product and a service around it."*
Participant: *"Oh, we do not have that."*

Furthermore, while showing the concepts, we did not provide any structure. Some participants preferred to have more structured keywords rather than the concepts themselves. *"Optimal lifetime [one of the code] is this aim or feature…its nice game you have it should have*

been more clear with the structure just as a recommendation and we say this is what we are this are not we are These are what we do or not I was confused some of the card or some of them not we don't but I have something to say about."

All in all, although the lack of structure is addressed as an issue, tangible tokens helped the researchers to decrease the possibility of misunderstanding between the researcher and the participants.

Conclusions

This paper introduced tangible tokens as a suggestion to collect data about the longevity of smart products and present the researchers' reflections.

Using tokens creates a vehicle for dealing with fluid terminology and subject complexity. The overall function of the approach was to be a framework that embodies, supports, and facilitates the identification of complexity and interdependencies of this inherently complex problem of longevity. Further, the method engages participants, allowing and promoting links between abstract concepts and concrete examples, thus facilitating a richer, more detailed, and operational outcome. It enables participants to become more explicit, clear, and reflective.

In conclusion, this paper highlights the potential benefits of using longevity-related codes in research. However, further development of the codes through a follow-up survey is recommended, and keywords have been provided for this purpose. The list of codes is accessible through the provided link and can be applied by design students in various contexts.

References

Buur, J. (2018). Tangible Business Interviews. In Freytag, P., Young, L. (Eds) Collaborative Research Design. Springer, Singapore. https://doi.org/10.1007/978-981-10-5008-4_8

Ceschin, F., & Gaziulusoy, I. (2016). Evolution of design for sustainability: From product design to design for system innovations and transitions. Design Studies, 47, 118-163.

Conrad, L. Y., & Tucker, V. M. (2019). Making it tangible: hybrid card sorting within qualitative interviews. Journal of Documentation, 75(2), 397-416.

Ellen MacArthur Foundation (2013). Towards the circular economy Vol.1: Economic and business rationale for an accelerated transition.

Özçelik, A., Löchtefeld, M., & Tollestrup, C. (2022). Long-lasting smart products: Overview of longevity concepts in sustainable ICT and design for sustainability. In D. Lockton, S. Lenzi, P. Hekkert, A. Oak, J. Sadaba & P. Lloyd (Eds.) Design Research Society: Vol.25. Bilbao. https://doi.org/10.21606/drs.2022.cv001

Sanders, E.B.N., & Stappers, PJ. (2012). Convivial toolbox: Generative research for the front end of design. BIS.

Sanders, E. B.-N., & Stappers, P. J. (2014). Probes, toolkits and prototypes: three approaches to making in codesigning. CoDesign, 10(1), 5-14. https://doi.org/10.1080/15710882.2014.888183

Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.

Sorenson, J., Kjærsgaard, M. G., Buur, J., Karyda, M., & Ağça, A. Ö. (2022). Theory Instruments as Tangible Ways of Knowing. In Ethnographic Praxis in Industry Conference Proceedings, 2022(1), pp. 38-55).

Raff, S., Wentzel, D., & Obwegeser, N. (2020). Smart products: conceptual review, synthesis, and research directions. Journal of Product Innovation Management, 37(5), 379-404.