Editorial

Juliane Jarke* and Susanne Maaß

Probes as Participatory Design Practice

This special issue is interested in some of the fundamental questions of participatory design: How future users can be involved in design processes in meaningful, empowering and creative ways. The particular focus is on the ways in which (cultural) probes may serve this purpose and can be understood as participatory design practice.

The concept of cultural probes was developed by Gaver, Dunne & Pacenti [5] to collect ideas for creative design solutions from prospective users: A set of materials and questions stimulate users to observe, document, reflect and comment on their own everyday life over a certain period of time. Examples for such probes are diaries, cameras, postcards or maps. As a means of writing ethnographic self-description and self-disclosure and in combination with interviews or group discussions, they allow to communicate insights about everyday processes and structures, which are difficult to observe or investigate otherwise. Since their first introduction, cultural probes have enjoyed increasing interest in the field of human-centred or user-oriented software design. The concept has been amended to include concepts such as "design probes" [10], "technology probes" [8] or "mobile probes" [7] amongst others.

There are a number of reviews on the ways in which probes have been appropriated and used in different design contexts. Graham et al. [6] review how probes "work". They state that probes work "both as a means of engaging and provoking responses from participants and as a resource for those involved in design" (p. 29). More specifically probes work as capture artefacts, (auto)biographical accounts, by making the invisible visible, by establishing participants as experts and by facilitating dialogue and conversation. Graham et al. also ask what probes "do" and point out that they "humanise" participants, create fragmentary accounts of users' lives, they use uncertainty and ambiguity, they inspire, they engender interpretation and they provoke. Boehner et al. [3] raise a different question and review how HCI research interprets probes and how probes have been appropriated for different purposes in HCI. They categorise the uptake of probes along the following themes: probes as packet (probes as a kind of ready-made kit including cameras, postcards, maps etc.), probes as data collection (at times in combination with interviews in order to capture people's reflection about some part of their life), probes as sensitisation (picking up on the provocative, experimental and ambiguous nature of probes) and probes as participation method (where participants play a role in interpreting and translating probe responses into design ideas). However, in a review of co-design practices, Sanders and Stappers [12] observe that most often probes are used in projects which are design-led and in which users are research subjects (e. g. user-centred design) rather than partners who have a say in the design process. Hence, probes are mainly used as inspirational base for designers or for the elicitation of requirements.

Overall, the three reviews are highly interesting for the purpose of our special issue in that they display the variety in which probes have been used across design processes. This may be because probes "embody a different set of sensibilities from most other social research methods" [2, p. 187], as they "open up possibilities, rather than converging towards singular truths, and can be understood as part of a conversation among designers and the people and places for which they design" (ibid.). It is this particular quality of probes that we are interested in exploring further: How probes can be understood as a participatory design practice that enables participating users, designers, social scientists and software developers to engage in meaningful conversations about their visions for future design. We are exploring the role and potential of probes beyond mere requirements elicitation and inspiration for designers and inquire how probes may allow future users to become partners in a design process rather than design subjects.

Participatory design has a long history of user (or worker) empowerment. It aims at sharing control with users, sharing expertise and facilitating individual, organisational and technological change [13, 4, 1, 14]. This special issue features a number of contributions that provide

*Corresponding author: Juliane Jarke, Institute for Information Management Bremen (ifib) & Centre for Media, Communication and Information Research (ZeMKI), University of Bremen, Bremen, Germany, e-mail: jarke@uni-bremen.de
Susanne Maaß, Department of Mathematics and Informatics, University of Bremen, Bremen, Germany, e-mail: maass@informatik.uni-bremen.de

insights into how probes can advance participatory design. It is based on a workshop we conducted in September 2017 during the conference "Mensch & Computer 2017" in Regensburg, Germany, [9] and in which we discussed the role of probes for requirements elicitation. Some of the questions we attended to in the workshop were: Why were probes used in our design projects? What kind of probes were used and what kind of information did they provide? Are there any quality criteria for "good" probes? How were probes embedded in the subsequent design process? Which strengths and weaknesses does the probes methodology have?

In particular, the question concerning the embedding of probes in the subsequent design process came into focus as all our workshop participants were using probes in some way or another to empower future users and facilitate participation in their projects. It was hence this focus on involving and empowering users that caught our attention and formed the basis for this special issue. We will now provide a brief overview on the contributions of this special issue and close our editorial with some overall observations.

Hensely-Schinkinger et al. used probes in a pre-study to their project on technology support for informal caregivers. In this sensitive research setting, probes allowed them to get a glimpse into the world of informal caregivers, their everyday routines, practices and challenges. The paper provides an introduction to probes in general and a detailed description of the probes designed for and used in the project.

Maaß and Buchmüller reflect on the important role probes may play in participatory design for and with older adults. In their contribution, they describe in what way probes, as a first step, became a fundament for the entire participatory process that followed in their project. Their paper provides an illustrative example of how probes with subsequent interviews sensitise participants for their own daily life and how they help to prepare a lasting "third space" [11] for confident and productive cooperation between designers and participants which may lead to a design focus that fits user requirements.

Jarke and Gerhard explore the role of probes for sharing participants' (tacit) knowing and describe how probes may facilitate perspective taking and perspective making among users and between users and researchers. Probes, hence do not only document users' everyday activities, but also become a tool for collective sense-making.

Berger et al. attend to questions of user empowerment and how probes may facilitate the acquisition of data literacy. They present creative uses of sensors through which participants engage with their own living environment and everyday practices. Such sensor probes (e. g. modular Internet of Things (IoT) toolkits) can inform questions relating to the ethical, social and legal implications (ELSI) of technology design by empowering users to raise those questions themselves as digitally literate and knowledgeable individuals.

Koch and Maaß discuss how traditional probes might be translated into a digital format and run on mobile phones. Such a substitution of analogue media would have to preserve the strengths of traditional probes and to overcome some of their weaknesses. The authors propose a concept for digital probes in form of a digital diary and describe its potential implications for the communication between researcher and participants.

Overall, the probes presented in this special issue cover a great variety of materials from rather traditional, paper-based probes including maps, diaries and post cards to disposable cameras to sensor probes. The papers demonstrate that probes can facilitate the empowerment of users (*Berger et al.*), serve as ethnographic documentation (*Maaß & Buchmüller, Jarke & Gerhard, Koch & Maaß*) and as inspiration for designers (*Hensely-Schinkinger et al.*). Most of the research settings involve participatory design projects with older adults in order to learn about specific aspects of the lives of older adults. For example, *Maaß and Buchmüller* explore the transitioning phase from work to retirement, *Hensely-Schinkinger et al.* focus on the daily life of informal caregivers and *Jarke and Gerhard* are interested in the concept of ageing in place and place-making practices of older adults in their neighbourhoods. The papers describe their use of probes as a way to "build bridges" and create a collaborative space in which all participants can learn about themselves and each other. And although the probes packs described in this special issue are very different from each other, there are a few common dimensions to their design and use. Authors consider probes as good when they communicate appreciation and trust to the participating users. It is important that the questions and tasks that the probes pose are appropriate and adequate. The probes must be self-explanatory or have to be explained to users in detail.

In addition, as probes became appropriated in and for the process of requirements elicitation, questions of how to systematically analyse and interpret probes arose. In particular, in participatory processes, formats for joint interpretations are sought. The papers in this issue describe various ways of embedding probes in the design process. All projects presented conceive of probes as a method to be used early on in the process, that combines the interpretation of probes with individual interviews, focus

groups and workshops. For example, in *Jarke's and Gerhard's* project some of the probes (maps and postcards) were exhibited in a workshop and participants jointly interpreted them with respect to why and how they differed. This process facilitated the perspective making and perspective taking of participants. *Berger et al.* developed a workshop format for collaborative sense-making of data visualisations of their sensor probes called "Daten Raten" (Guess the Data): Participants were shown graphs of sensor data from other participants' homes and were encouraged to guess what everyday activities these data might represent. The authors argue that such kind of engagement methods sensitise participants to surveillance scenarios and mechanisms and increase their critical data literacy. What is striking is that probes assume the role of a communication device amongst participants but also between participants and researchers.

References

[1] Bjögvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Design things and design thinking: Contemporary participatory design challenges. *Design Issues*, *28*(3), 101–116.

[2] Boehner, K., Gaver, B., & Boucher, A. (2012). Probes. In C. Lury & N. Wakeford (Eds.), *Inventive methods: the happening of the social* (pp. 185–201). London: Routledge.

[3] Boehner, K., Vertesi, J., Sengers, P., & Dourish, P. (2007). How HCI Interprets the Probes. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1077–1086). New York, NY, USA: ACM. https://doi.org/10.1145/1240624.1240789.

[4] Bratteteig, T., & Wagner, I. (2016). Unpacking the notion of participation in Participatory Design. *Computer Supported Cooperative Work* (*CSCW*), *25*(6), 425–475.

[5] Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: Cultural Probes. *Interactions*, *6*(1), 21–29. https://doi.org/10.1145/291224.291235.

[6] Graham, C., Rouncefield, M., Gibbs, M., Vetere, F., & Cheverst, K. (2007). How probes work. In *Proceedings of OzCHI 2007* (pp. 29–37). ACM Press. https://doi.org/10.1145/1324892.1324899.

[7] Hulkko, S., Mattelmäki, T., Virtanen, K., & Keinonen, T. (2004). Mobile Probes. In *Proceedings of the Third Nordic Conference on Human-computer Interaction* (pp. 43–51). New York, NY, USA: ACM. https://doi.org/10.1145/1028014.1028020.

[8] Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., et al. (2003). Technology Probes: Inspiring Design for and with Families. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 17–24). New York, NY, USA: ACM. https://doi.org/10.1145/642611.642616.

[9] Jarke, J., & Maaß, S. (2017). Anforderungserhebung mit Cultural Probes. *Mensch Und Computer 2017 – Workshopband*, *93*, 61–63.

[10] Mattelmäki, T. (2006). *Design probes*. Aalto University. Retrieved from https://aaltodoc.aalto.fi:443/handle/123456789/11829.

[11] Muller, M., & Druin, A. (2012). Participatory Design: The Third Space. In J. A. Jacko (Ed.), *Human Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications* (pp. 1125–1153). Boca Raton, FL: Taylor & Francis.

[12] 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.

[13] Simonsen, J., & Robertson, T. (Eds.). (2013). *Routledge international handbook of participatory design*. New York: Routledge.

[14] Vines, J., Clarke, R., Wright, P., McCarthy, J., & Olivier, P. (2013). Configuring participation: on how we involve people in design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems Pages* (pp. 429–438). ACM Press. https://doi.org/10.1145/2470654.2470716.

Bionotes

Juliane Jarke
Institute for Information Management Bremen (ifib) & Centre for Media, Communication and Information Research (ZeMKI), University of Bremen, Bremen, Germany
jarke@uni-bremen.de

Juliane Jarke holds a PhD in Organisation, Work and Technology from Lancaster University Management School. Her background is in Informatics (BSc), Philosophy (MA) and IT Management & Organisational Change (MSc). She is a senior researcher at the Institute for Information Management Bremen (ifib) and the Centre for Media, Communication and Information Research (ZeMKI) at the University of Bremen. She is Co-PI in the EU-funded research and innovation action MobileAge on Participatory Design in Civic Tech and Open Data.

Prof. Dr. Susanne Maaß
Department of Mathematics and
Informatics, University of Bremen, Bremen,
Germany
maass@informatik.uni-bremen.de

Susanne Maaß is a professor for Applied Informatics and leader of
the work group Sociotechnical Systems Design and Gender (SoteG)
at the Department for Mathematics and Informatics of the University
of Bremen, Germany. She works in the area of requirements elici-
tation, participatory design, user-oriented software development
and computer-supported cooperative work, integrating gender and
diversity aspects in her teaching and research.