

Personal Interaction through Individual Artifacts

Lisa Ehrenstrasser¹, Wolfgang Spreicer²

iDr-inklusiv Design & research¹

Institute for Design and Assessment of Technologies, Vienna University of Technology²

Abstract

Understanding and executing interactions with communication interfaces can be a bitter process, especially with basic or none technology knowledge. The paper gives insights in developing a tangible interface called *kommTUi*, a single user communication interface triggering interaction through a mixture of pre-produced, generic tokens and personal artifacts both serving as objects for defined interactions. We explore the importance of individualising tokens and personal relations between objects and users for interaction design and present findings from participatory design workshops.

1 Introduction

Recent discussions in the TEI community about future directions for the design of tangible systems suggest a shift away from creating seamless user interfaces to seamful mappings and a higher degree of appropriation by the user (Hornecker 2012). We want to contribute to this discussion by presenting our approach of designing personalized tangible interfaces. Referring to Tofflers term *prosumers* (Toffler 1980), we propose that users should participate in the design of products and interfaces. Recent developments underline the trend to dissolve strict distinction of producers and consumers. On the online platform NikeID¹, for example, users can customize and personalize their shoes before they purchase them. The product designers provide the basic form, the consumers/users appropriate it to their needs. In this paper, we describe how we facilitate interaction through personalized tangible objects. Our research aims are to scrutinize the role of personal artifacts for communication tools, observe how familiar objects support interaction and how this can influence design and set-up of a communication interface.

¹ <http://nikeid.nike.com> (05.06.2012)

1.1 Background

In our previous paper, we scrutinized the differences of generic and personalized tokens for tangible interaction (Ehrenstrasser & Spreicer 2011). We have defined generic tokens as containers with well-known geometric shapes, predefined size and material. These tokens physically embody abstract digital data and can be easily integrated into a token+constraints set-up as a support for known chains of actions and shape patterns (Ullmer et al. 2005). On the other hand, we have defined personal tokens as individual objects with a special meaning to the user. These can be everyday or self-made objects, representing physical, autobiographical objects of memory, reminding the owner of special moments or friends (González 1995). Through the emotional linkage between the object and the user, personal tokens turn into *keys*, which can only be decoded by the owner of the object. While generic objects have been used since the first concepts of TUIs like the Marble Answering Machine (Poyner 1995), the usage of personalized tokens for user interaction came up within the last decade. The ME-MODULES project uses a combination of RFID-technology (Radio-Frequency Identification) and image recognition for creating „tangible shortcuts“ to ease the use of new technologies (Mugellini et al. 2009). The Alcatel Lucent venture *touchatag*² used RFID-stickers to link objects with different functionalities of traditional computer systems. Ishii et al. propose a different approach for personalized tangible objects in their vision for future tangible systems called *radical atoms*: pre-produced dynamic physical materials react and transform according to user input (Ishii et al. 2012). As van Hoven (Hoven, E. A. W. H. van den 2004) argues, the interplay between generic and personal tokens in the field of Tangible User Interfaces is still worth observing and scrutinizing further.

2 Design

To evaluate our approach, we conducted participatory workshops with a heterogeneous group of people between 55 and 70 years with different prior knowledge of ICTs (Fisk et al. 2009), based on the experience and findings from the workshops in 2010 (Ehrenstrasser & Spreicer 2011). We planned our second round of workshops with one group of participants, who have already attended in 2010 and one group with totally new participants. We used space, rooms and equipment to create a playful and harmonic workshop surrounding. Next to workshop design, our design work consisted of:

- Artifacts, mock-up and technical probe design: We provided a workshop package for each participant with three pre-produced, generic tokens, ready to be equipped and annotated in the design session at the beginning of each workshop. These generic tokens had a specially designed form and shape for our context of use (Fig. 1) to have a strong connection between the shape of the token and the corresponding slot. For annotating the tokens we provided stickers, icons, pen, paper, etc. Furthermore, we asked every participant to

² www.touchatag.com (04.06.2012)

bring an object, which reminds him or her on a very special friend or relative. These autobiographical objects were used to promote the linkage between the memory of a special person and the tangible element of the interaction (González 1995). The personal objects have been equipped with RFID tags to use them directly as *personal tokens* for the user interaction. The generic and personal tokens were part of our technical probe, which consists of a netbook embedded in a wooden case. On the top of the screen there are two areas, each equipped with a RFID reader, on which the users can place their tokens. The left area provides a slot, shaped like the bottom of the generic tokens. This similarity in shape should guide the user where and how to position the token on the probe. The personal tokens are placed on the right area, marked with a colored rectangle. Our token design is used to scrutinize the interplay between generic and personalized objects in our workshops.

- **Interaction design:** We introduced three use cases for user interaction with the technical probe – Starting a voice-over-IP call, sending a photo and sending a note. To start the interaction, the user had to choose the functionality by placing the particular generic token. After that, the user had to determine the recipient by placing the personal token. This interaction also started the call or the transmission. Each interaction was followed by acoustic feedback and visual feedback on the screen.

The design of the tokens is twofold, as we have our pre-produced generic tokens and the personal artifacts brought by participants. We argue that personal objects can embody specific stories, meanings known often only by the object owners. Therefore our definition of personal interaction is the usage of personal relations with artifacts triggering interaction, which is as well one of the essential design decisions to be explored in *kommTUi*. In the following section we will outline the conducted workshop and our categories of observation.

3 Observation and Analysis

- In the observations we focused on our argument of supporting interaction with personal objects. First of all, we scrutinized the equipping process of the generic tokens (e.g.: photos, symbols) during the design session. In addition, we examined whether this individualization extends generic objects to subjective objects in a way, that the emerging symbolic relation between the user and the object triggers the desired interaction (González 1995). Furthermore, we focused on how participants used interface and surrounding space and how the RFID interaction was perceived and used. Finally, we observed the use of generic and personal tokens – more detailed: the role of personal objects triggering interaction.

In the following section 3.1, we present examples of two participatory workshops, showing the importance of individual triggers supporting understandable interactions and specific relations of participants with their artifacts.

3.1 Examples

The workshops agenda consisted of a guided “design session” with all participants (station 1), followed by the specific interaction situations carried out individually (station 2) along *think aloud* and accompanying interviews (Fisk et al. 2009). The workshop ended with group discussion and reflection.

3.1.1 Example 1 – use of generic tokens in the “design session”

The generic tokens (each participant got 3 items, according to the type of communication) had to be equipped and personalized in the “design session”. The participants had to think about what kind of icon or annotation they would use to show the specific interaction - call, send note, send photo (Fig. 1). On the account of “personalizing interaction”, we added to the generic tokens the personal level – to make them individual and a personal key for the users and their communication interaction.



Figure 1: Generic tokens equipped with selected icons by our participants.

3.1.2 Example 2 – use of personal token

The personal token (= artifact with personal history and meaning for a specific person, and a mounted RFID tag to trigger the technical interaction on a hidden place) helped to visualize the communication partner and served as “phidget”. The set-up of the technology probe provided the frame for the participants to try out to trigger interaction with the personalized generic tokens and individual artifacts (Fig. 2, left).



Figure 2: User interaction with personal tokens

- Each participant was asked to bring a personal item, which reminds him/her to a special friend or relative. Figure 2 (right) shows a metallic animal, reminding the participant of

his wife. The item brings to him his wife in thoughts and is therefore the perfect artifact to serve as interaction token – triggering the digital communication by placing the animal to the defined spot on the prototype. The third photo (Fig. 3) shows a bottle cork in the form of a zebra, reminding one of our participants about her daughter. She told us, that if she hasn't talked to her daughter for a while, she turns the zebra so that the head is pointing away from her. If she feels close to her daughter, she turns the zebra so that the head is pointing towards her.

- The participants' approach towards the technical probe was very diverse: some were standing in a little distance, scrutinizing what laid in front of them, carefully not to touch it, needing strong invitations to start interacting. Others were happily jumping right into interacting with the technology probe.

4 Results

In the two workshops conducted in 2011 we explored a way of triggering interaction through a mixture of tokens: generic, but individually annotated and personal objects. Our focus in *kommTUi* lies on the design of tokens and the use of personal artifacts as interaction trigger. Therefore our token design is twofold: it is generic, since pre-produced by the development team itself, hence personal because of the individual annotation during the design session and the use of artifacts brought in by participants. Summarizing, our findings are:

- Time to start the very first interaction with the new RFID interface is very individual; hence the second round of interaction was carried out fast for every participant.
- The token+constraint relation of the generic tokens and the corresponding slot was understood well. The distinction of the different functionalities of the generic tokens worked out very well due to individual annotation.
- Personal artifacts adapted as tokens helped fostering the relation with communication partners and interaction itself. It “deepened” the communication aims through the selected objects with its own stories and embodied experiences.
- Simple interaction with the technical probe through personal and personalized artifacts was welcomed and especially perceived as useful even for very old age.
- The participants argued against purchasing an additional device for their homes.
- Our invitation to bring own objects and use them to trigger interaction enriched the communication, the experience with the interface and lowered the access barriers towards the interface. Participants were not shy to use their familiar objects.
- Through personal annotation and re-design of the pre-produced tokens the interplay between generic and personalized objects was successful.

The ad-hoc equipping (attaching RFID tags, annotating) made it possible to further explore the importance of familiar artifacts by reducing the barrier of interacting with a novel

interface. Our findings show how personal objects can support interaction and reduce access or emotional barriers towards technology by using familiar artifacts with personal relation to the users. This can be helpful for further design and development of ICT products.

5 Conclusion

We argue that the use of personal artifacts supports interaction with novel interfaces. Personal objects “embody” a specific story known by its owner creating an individual relation to somebody or a situation. Therefore, they can link and support interaction, by equipping these objects with RFID tags and serving as tangibles for pre-defined interactions. Additionally, the role of users as co-designers enhances the advantages of generic tokens. Through individual annotations, generic tokens not only benefit from their affordances, but also from the personal relation to the users. Further development and design will be focused on the integration of our current technical setup into various common devices like: smart phones, tablets, home computers, notebooks. The major challenge here is to achieve the same interaction and functionality on different tools in order to further refine the RFID interaction with personal tokens as interaction key.

References

- Ehrenstrasser, L., and Spreicer, W. (2011). Tokens: Generic or Personal? Basic design decisions for tangible objects. In: Eibl, M., and Ritter, M. (Hrsg.): *Workshop-Proceedings Mensch & Computer 2011*, Chemnitz: Universitätsverlag Chemnitz, S. 25-28.
- Fisk, A. D., Rogers, W. A., Charness, N., Czaja, S. J. and Sharit, J. (2009). *Designing for Older Adults. Principles and Creative Human Factors Approaches*. Second Edition. CRC Press
- González, J. A. (1995). Autotopographies. In Brahm, G. Jr. and Driscoll, M. (Hrsg.): *Prosthetic Territories: Politics and Hypertechnologies*. Boulder, USA: Westview Press, S. 133-150.
- Hornecker, E. (2012). Beyond affordance: tangibles' hybrid nature. In Spencer, S. N. (Hrsg.): *Proceedings of the Sixth International Conference on Tangible, Embedded and Embodied Interaction (TEI '12)*, New York, USA: ACM, S. 175-182.
- Hoven, E. A. W. H. van den (2004). *Graspable Cues for Everyday Recollecting*. The Netherlands: PHD Thesis, Department of Industrial Design, Eindhoven University of Technology.
- Ishii, H., Lakatos, D., Bonanni, L. and Labrune, J-B. (2012). Radical atoms: beyond tangible bits, toward transformable materials. *Interactions* 19(1), 38-51.
- Mugellini, E., Lalanne, D., Dumas, B., Evéquo, F., Gerardi, S., Le Calvé, A., Boder, A., Ingold, R. and Khaled, O. A. (2009). MEMODULES as Tangible Shortcuts to Multimedia Information. *Lecture Notes in Computer Science* 5440, S. 103-132.
- Poyner, R. (1995). The hand that rocks the cradle. *The International Design Magazine*. May-June 1995.
- Toffler, A. (1980). *The Third Wave*. New York: Morrow.
- Ullmer, B., Ishii, H. and Jacob, R. J. K. (2005). Token+constraint systems for tangible interaction with digital information. *ACM Trans. Comput.-Hum. Interact.* 12(1), 81-118.