

Discovering Madeira: A Case Study of Cultural Probes

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ABSTRACT

This paper describes a case study of using Cultural Probes in an early stage of a ‘research-through-design’ project aiming at innovations in social media. We discuss our rationale and process of designing the cultural probes, along with the method developed for interpreting the responses. Finally, we present some of the insights gathered and how these lead to ideation.

Keywords

Cultural probes, social media, user studies, design process, reflective HCI

INTRODUCTION

This paper presents and discusses the research method of the first phase of the Madeira Life project that seeks to motivate and facilitate social activities in both local communities and visitors of the islands in the Madeira region. While tourists generally show a strong interest in cultural aspects of life at their tourism destinations, there are many obstacles for connecting visitors with residents. The hypothesis in our project is that social media and related new technologies offer opportunities for building and strengthening local communities as well as sharing socio-cultural experiences and values with visitors in an engaging and unobtrusive way. The first phase of the project conducts user research to increase our understanding of the local communities and to identify the social and cultural aspects and activities in these communities that can benefit from the potential of social media. The user research helped us acquire an understanding of the various communities in terms of values, relationships, experiences, behaviours, habits, preferences, problems, emotions, assets, and so forth. With a deeper understanding of these social aspects, we were able to find valuable inspirations and even clear directions for opportunities to innovate the ways these communities communicate and share information, media content, and experiences.

The socio-economic milieu that the project is situated in presents a wicked problem [17], suggesting conflicting

goals between stakeholders. Tourists want to interact with residents and have a genuine local experience of food, traditions and sites of the island, albeit without having to encounter crime or affecting the overall comfort of their visit. Residents view tourism favourably since it contributes greatly to the local economy, yet find tourists inconvenient sometimes since they have to share their daily environment, beaches, and restaurants with them. Services and applications designed for this context hence would have to take into account these conflicts and channelize them into a mutually beneficial dialogue between stakeholders.

Earlier projects, such as the i3 Campiello project at PARC Xerox [16], tried to address this problem space through intelligent paper, community walls and mobile device interfaces; however, a lot has changed over the years in terms of social networking and communal information sharing.

For this first stage in the project our research focuses on the residents of Madeira, since having an understanding of the local community and its needs is an important factor in addressing this wicked problem. This approach is helping us identify research areas and potential design spaces where new technologies can support social opportunities for residents in the context of culture, community, traditions, environment, and identity.

Looking for projects with comparable objectives, we’ve found inspiration in the approach reported by Gaver et al. [10, 11, 12] on Cultural Probes. In particular their intention to concentrate on “cultural implications of [their] designs and ways to open new spaces for design” was appealing to us. Their approach was focused on understanding the culture of their users and engaging users in discussions toward “unexpected ideas.” Cultural probes have been adopted, since 1999, in many other research projects. In the next section we will review how the use and effects of probes have been interpreted and discussed in literature.

In this paper we discuss the method we have used to gain an understanding of the local community, of which Cultural Probes form an essential component but are complemented with interviews. The objective of writing this paper is to demonstrate how our use of Cultural Probes and our method of enhancing their value through follow-up interviews have led to better-informed decisions regarding the directions to take our project in and resulted in a rich

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source of information to be explored for inspirations and motivations for design initiatives. We argue that combining Cultural Probes with follow-up interviews offers ways to extract information from subjects on pre-meditated design questions, as well as stimulate creativity and ideation, exploring design spaces in collaboration with subjects.

This paper also contributes as an interpretation of Zimmerman's 'research-through-design' model: the process of ideating, iterating, and critiquing potential solutions, grounded by an integration of "true knowledge (the models and theories from the behavioural scientists), how knowledge (the technical opportunities demonstrated by engineers), [and] real knowledge" (the ethnographic studies produced by anthropologists and design researchers) [19]. Regarding the 'real knowledge' referred to in this model, our approach demonstrates how Cultural Probes offer an inspiring form of design research that, through functional use of its ambiguity, provides deep insights into user needs as well as opportunities for creativity.

After a discussion of related work, we describe our interpretation and application of Cultural Probes. We then discuss how the results from the probes and follow-up interviews have led to valuable insights and consequent concepts.

RELATED WORK

Cultural Probes were originally inspired by Situationist practices such as *dérive* and *détournement*. *Dérive* has been defined as "the study of the precise laws and specific effects of the geographical environment, consciously organized or not, on the emotions and behaviour of individuals" [5]. It entails exploring the physical environment of a city by walking around without any goals, guided only by the affordances and constraints of the space. It aimed at articulating a more immersed, participatory and humane view of physical space. *Détournement* is a subversive strategy that rearranges media elements to question their assumed meaning / status quo, allowing for critical reflection and consequently bringing forth awareness of new alternatives.

Gaver et al. [11] originally deployed Cultural Probes as an alternative method to gain a rich understanding of people's everyday lives and environments. The Probe packets were distributed as remote kits that the participants would engage with in their own environments at their own convenience. The contents of these packets contained elements and activities inspired by the practices of *dérive* and *détournement*. For instance, in the spirit of *dérive*, the maps prompted participants to reflect on their physical surroundings, offering insights into people's emotions, insecurities and wishes associated with specific locations. Whereas, the postcards and cameras, in the spirit of *détournement*, enabled the participants to express and share their personal idiosyncrasies and intimate accounts of their everyday lives with the researchers.

Sonic City [13] used Cultural Probes as a means to get insights into people's everyday environments, types of path they take and their perception of them prior to evaluating their system. Dey and Guzman [7] used Cultural Probes to get informative responses from respondents about awareness and connectedness. The results from their probes not only supported some of their earlier results in Contextual Inquiry sessions, but also inspired divergent concepts that were situated in the respondents' personal and shared spaces.

Graham et al. [14] identified common themes across probes in terms of what they do, despite their various forms. The value of the probes, they assert, lies more in the constant dialogue with participants than in the value of uncertainty. As the remainder of the case study will further reveal, we value the original essence of Cultural Probes' ambiguity [9] without sacrificing the opportunities of a more sustained dialogue with the local community.

Some of the key debates that we found relevant for informing our own adaptation of Cultural Probes revolved around the aspects of information, inspiration, ambiguity and the degree of participation. Crabtree et al. [4] focused on the informational aspects of their adaptation, gaining insights into people's routines and concerns. Graham [15] highlights that although the participatory nature of probes has been seldom questioned, the degree of participation in different kinds of adaptations is often debated. Dourish [8] 'discounts' Cultural Probes as a rejection to ethnography inquiry, whereas Boehner et al. [2] ascribe these debates to be rooted in a lack of clarity in HCI about the differences in hermeneutic and positivist frameworks in approach. They further assert that some researchers downplay the subjective stance of the designer that was innate to the original intentions by aiming for conclusions.

PILOT STUDIES

Figure 1 shows the design process of the cultural probes in this project. Based on observations of the island's inhabitants and visitors, we concluded that relationships were a key issue in understanding the cultural and social dynamics. To direct our inquiries, we chose 'place' as a central notion in our investigation of local communities and adopted the four dimensions of place (Physical, Personal, Social, and Cultural) as identified by Ciolfi and Bannon through analysis of Tuan's writings [18]. Ciolfi and Bannon [3] discuss how Tuan's vision of place is grounded on a so-called experiential perspective. "Each dimension is present at any moment of one's experience of a place and the experience is shaped by the dynamic interconnections among these dimensions." "These dimensions [...] emerge through people's actions and activities, practice and experience. In order to understand a place and its inhabitants, all these dimensions and their interplay with each other have to be taken into account." [3] They articulate a framework based on these four dimensions and demonstrate how it might be useful for the design of interactive spaces.

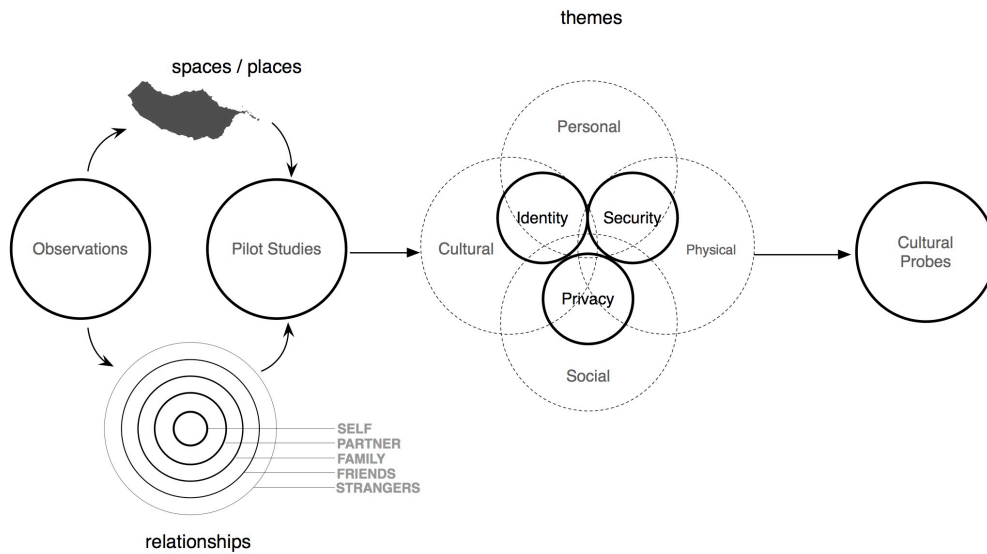


Figure 1 Process of designing the cultural probe kits.

The four dimensions of place we adopted from the framework by Ciolfi and Bannon [3] are:

- Physical* related to materials, structures and environmental features;
- Personal* related to the feelings, emotions, memories, and personal knowledge;
- Social* related to social interaction and sharing of resources and memories;
- Cultural* related to the rules, conventions and cultural identity of a place.

As a starting point for designing our cultural probes, we conducted pilot studies to calibrate the instruments we planned to deploy and to attain a more rigorous focus in our approach. The pilot studies helped refine our approach of using the four dimensions taught lessons for the design of the actual cultural probes. The following four activities were included in the pilot studies.

1. Casual observations and interviews

Observations of residents and tourists' behaviour in public spaces: how they organized themselves and planned their activities around the city, offering insights into needs and notions of identity and security.

2. Map tagging

Residents were asked to tag places on a publicly displayed map and provide keywords associated with these place (Figure 2). Questions like "Which places do you go to with your friends?" and "What places are culturally interesting for tourists?" offered an impression of people's mental map of the territories they associate as, e.g., home, work, familiar, forsaken, near, solitary, or crowded.

3. Shadowing

A GPS device was used to shadow a resident on his daily route to and from work. The participant was asked to take geo-tagged photographs of objects, places, and events and was accompanied the next day to these locations and asked to share what they represented to him.

4. Photo tagging

Residents were asked to share their thoughts and memories through tagging and photographing of spaces and objects that held some physical, personal, social, or cultural value to them (Figure 3).

Emergent themes

Through observations and interviews during the pilot studies, patterns emerged that helped articulate three themes that appeared relevant for the local population. We used these themes to inspect the previous four dimensions and to drive our inquiry process. Each theme brings along questions that inspired the design of the cultural probes (see the design process shown in Figure 1).

- Identity* How do people identify themselves in relation to the four dimensions?
What are the characteristics in these four dimensions that provide identity?
- Privacy* What are the boundaries in these dimensions that people define for their privacy? What do residents want to share and with whom?
- Security* What factors influence people's notions of security in relation to physical and cultural aspects of everyday life?

Lessons learnt from the pilot studies

Our observations and experiences during the pilot studies allowed for many lessons to be learnt that were important for the design of the cultural probes kit.



Figure 2 Map Tagging: places of interest tagged on a publicly displayed map.



Figure 3 Photo Tagging: hints of memories, thoughts, and feelings.

Foster creativity

The photo and map tagging activities taught us that the design of the activities and tools in the cultural probes should invite creative responses. Once engaged and motivated, people like to express themselves and are eager to make their contribution in a playful way.

There needs to be a balance between driving participants' understanding of the kind of response expected from them and stimulating creativity, venturing into unforeseen directions. Narrative-driven scenarios are one way of achieving this, as they set off in a certain direction but offer opportunities to explore.

Bring the tools to the people

The publicly displayed map in the pilots yielded only limited personal responses, because of privacy issues but also because participants had to mentally relocate themselves through the map in order to recall personal experiences. Participation in the cultural probes should be a personal activity, offering privacy and time for reflection. Designing the probes as a kit that people take with them for some time allows this reflection to take place in context and makes this activity much easier and direct.

Triggered conversations

The reverse side of having activities in a public setting, such as the map tagging, was that they triggered many conversations among participants, but the pilot studies offered no way to capture these. This observation informed us that interviews following the activities with the cultural probes would yield rich responses.

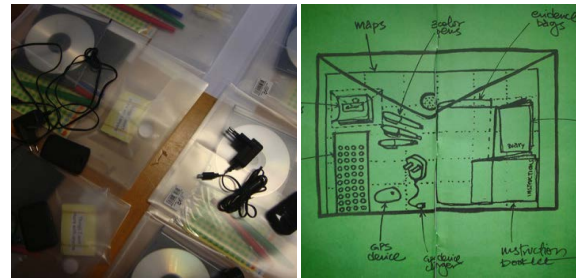


Figure 4 Cultural Probes kits and content overview.

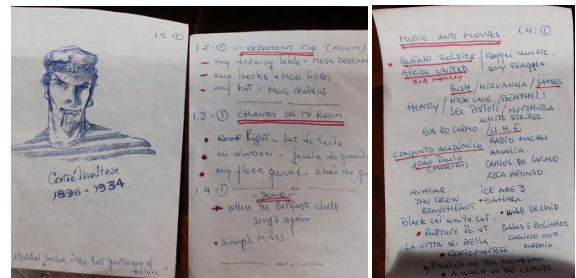


Figure 5 Sample of probe responses in the notebooks.

CULTURAL PROBES KIT

The probe kit was designed to be integrated into the participants' daily lives and activities enabling better insights into their personal environments and experiences. Each activity aimed to engage and stimulate free exploration, without the researchers' influence on responses. We recruited 10 residents for participation in our studies with duration of 4 to 5 weeks. Out of the 10 residents, 8 responded with completed activities.

Each Cultural Probes kit (Figure 4) was equipped with an instructions booklet for the activities, designed to motivate participants to contribute, create, explore and reflect using the kits. The content and design reassured participants of the value of any contribution. Following our experiences in the pilot studies, we made conscious decisions on the aspects of the respondents' lives that we wanted to investigate (the four dimensions and three themes) and the kit was designed to achieve this. In the design of the kit and instructions, we acknowledged the subjective stance of the designer that is often overlooked or downplayed [2].

The activities explained in the booklet included: drawing, writing notes, post-it tagging of people, places, and objects that have various levels of importance. Other activities consisted of providing short stories in a notebook provided (see Figure 5), taking photographs of subjects that relate to the respondent and their social networks, and tagging maps of their neighbourhoods, city, and the island of Madeira, focusing on topics such as 'you', 'your family', 'Madeira', 'privacy' (Figure 6).



Figure 6 Annotated map returned with the kit.



Figure 7 Evidence bag returned with the kit.

Numbered and coloured stickers allowed participants to match what they marked on the map with the annotations in the notebook. They were encouraged to use the notebook to discover and reflect, or contribute in any other way.

A GPS device enabled each participant to record their location during daily activities and routines. During follow-up interviews these GPS tracks were displayed using Google Maps, which allowed us to discuss the track and its annotations and to identify interesting places and events.

Lastly participants were asked to collect ‘evidence’ of their activities during the day, such as a shopping receipt or a cinema stub (Figure 7). This information provides insights into activities, often with date/time information attached, holding clues to habits, routes, routines, preferences, and movements.

INTERPRETATION OF THE PROBE RESPONSES

The responses received from the probe kits offered a rich manifestation of the notions and emotions triggered in the respondents. We were able to identify many socio-cultural values related to, e.g., places and communities, and also many issues that were experienced as problematic, such as the progressing individualisation of society and the decay of once beautiful places. Yet, the deeper understanding of these values and issues that we were looking for could not be obtained through the often relatively undetailed and abstract material alone. Already from the pilot studies we had concluded that conversation would be an essential aspect of our learning process. Therefore, a series of interviews, amounting per participant to a total of 4 to 10 hours, was conducted to sieve through the large volume of information created and collected by each respondent. Each of these sessions was recorded in audio and then transcribed. The objective for these follow-up interviews was not only to better understand the often-abstract or even mundane responses to each activity, but also to introduce a platform from which interesting conversations could spawn taking the sessions in a direction not anticipated but potentially enlightening. The responses from the probe kits, although often very interesting, were thus used as a triggering device during these conversations, while the three themes of identity, privacy, and security allowed us to direct the conversations.

After completion of the interviews, three sources of information were available to us for interpretation: the materials returned with the probe kits, the transcribed interviews, and our observations.

ANALYSIS OF THE INTERVIEWS

The interviews were transcribed and divided into statements that represented distinct notions uttered by the interviewees. The method we developed for interpreting the transcribed interviews involves a process of tagging each statement with keywords that we could then use to explore the collection of statements (see Figure 8).

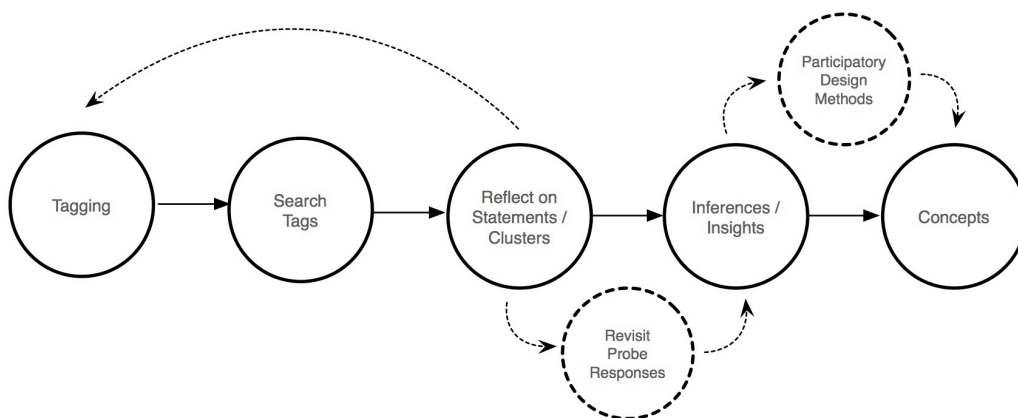


Figure 8 Process of interpreting and reflecting on the interviews and revisiting the probes.

Using our initial set of notions as a point of departure – the dimensions of place and the themes identified during the pilot studies – we associated more tags with every statement. The tags emerged in various ways: directly from summarising the statements, but also from our interpretation of the meaning or implication of the statements, for example in relation to the themes of identity, privacy, and security, but also in a more unbiased way of understanding the statements.

This process, as shown in Figure 8, is in fact an on-going process that does not necessarily come to any particular conclusion. It has produced a database of nearly 1500 statements associated with tags. A web-based tool was developed to facilitate both the tagging activity and the querying of data based on tags and combinations of tags.

The tagging method has a number of advantages over methods that require clustering and theme finding, such as those used in thematic analysis [1]. Compared to clustering, tagging the set of statements does not lead to disjoint categories of content, but allows overlap: this is essential in order to take many different points of view in interpreting the conversations and finding meaningful insights with an open-minded approach. Also, tagging the individual statements and the ability to query and browse them through the tags does not draw too much attention to the more generic tags, the ones with more statements associated. It emphatically allows incidental content to be tagged and gain attention, enabling the explorations and creativity of participants to emerge from the large amount of data.

INSPIRATION FROM THE CULTURAL PROBES

We explored two approaches in understanding how to use Cultural Probes to move towards conceptualization of new interactions. In the first approach, the *process* of working with the probes and, in particular, the follow-up interviews inspired the development of design concepts. The second approach was focused on the actual *content* resulting from both the probes and the follow-up interviews.

Inspiration from the Process

During the follow-up interviews, we openly experimented with the practice of *dérive* to uncover interesting topics of conversation while going through the responses that were often abstract and ambiguous in nature. By providing a platform for the respondent to reflect on their responses to the probes kit, they were encouraged to immerse themselves, along with the researcher, in an inviting participatory process with no set goals other than to gain a deeper understanding of the respondent and their lives.

We were charmed by the participants' many stories that came to us unpredicted. One of the respondents insisted on taking members of the research team to her neighbourhood to share places of interest or significance to her. In the spirit of the serendipitous nature of the original probes, we consciously welcomed this gesture and spontaneously accompanied. Much of the information shared consisted of authentic local experiences and stories from personal life,

which was greatly enhanced by physically accompanying the participant. The experience enabled us to understand the role of physical location in recollecting and telling these stories.

The joy of GPS tracks

1. When participants were encouraged to talk about their daily routines, rich information began to surface. The GPS activity allowed them to reflect on their daily activities and routes. Although most of the recorded tracks represented routines, more creative and interesting responses were observed where respondents went out of the way to explore their favourite activities and destinations. For instance, one respondent carried the GPS track while paragliding.

2. Participants enjoyed generating, exploring, and reflecting on their routes mapped out, privately or publicly, and were inspired to share these with others.

3. The unexpected stories were the most interesting, especially when experienced in situ, through the words and eyes of a local source.

These observations have inspired the design of tools that facilitate people in creating, sharing, exploring, and reflecting while on the move, either in routine activities or on special missions.

Concept: Breadcrumbs iPhone application

The en-route stories inspired us to attempt to recreate these chance events for people who are discovering new places. In the natural ways that people discover places and artefacts, serendipity plays a key role: people like to be surprised when they are actively exploring their environment. The design opportunity that presents itself is to provide tools for the creation and consumption of such serendipitous moments. The Breadcrumbs mobile app allows leaving and finding trails of experiences over time and space. Virtual breadcrumbs, rich with stories and media content, can be dropped by story-tellers and picked up by visitors, enabling chance encounters that otherwise would be lost.

Inspiration from the Content

While on the one hand reflecting upon the process of the probes itself acted as inspiration, on the other hand the information offered by the returned probe materials revealed discernible patterns about their daily routines, sharing practices, personal / collective expressions, traditions and social networking practices. Social networks were identified as an important medium for instantaneous self-expression and social dialogue. Music, in particular, qualifies as a common good and a culturally acceptable / preferred form of gifting and expressing on these social networks.

Familiar strangers

Respondents talked about the changing relationship with their local neighbourhoods and the people that they share these with. One respondent described how their neighbours no longer casually meet and talk during their daily routines due to increasing workloads and time pressures. Another

told us of a foreigner who had moved into her neighbourhood over two years ago but still does not know anyone. Another describes that due to easier access to the city and large-scale supermarkets, events such as shopping locally and the social element attached to it has been radically affected.

“People don't go to the farms anymore. They go to the supermarket.”

“When I grew up I watched my Mom talk to the neighbours across the fence, on the way to the shop, coming from church, always meeting, talking for hours.” [This apparently does not happen anymore.]

“I have lots of neighbours but they come home, they go, they come home, they go, they don't talk with anyone so I don't talk with them.”

“When I was young I played on the road with my neighbours. Now I have four or five young neighbours and I never see them play on the road.”

These statements inspired to explore ways of motivating people to become more social through thinking about the spaces they use and with whom.

Concept: Reflected Spaces

“Reflected spaces” is an interactive installation centred on people's routines, public spaces, and people flow. Focusing the concept of “familiar stranger”, it prompts people to reflect about the social and physical activities that take place around them. The installation consists of a camera, a large display, and a phone, all placed in a publicly accessible location. On day one, the camera records people passing by and reflects them in real-time on the display. The next days, recorded video is overlaid on real-time footage at the exact same time as it was recorded the previous day. A phone in front of the installation provides a casual means to record messages. Passers-by can explore these messages by picking up the phone to hear and watch what was recorded.

The installation literally confronts people with the ways they use and interpret spaces through their daily routines. It motivates chance encounters that would normally be missed through the separation in time. It also explores the role that artefacts (the phone, in this case) play as mediators of information allowing users to discover and share.

The role of music in forming special interest communities

“One day I decided to go to the beauty parlour to get my face, make up and hair done and afterwards I was so happy I told the lady I would put the song 'Man, I feel like a woman' on my Facebook when I got home.”

“If you type Bailinho da Madeira on the Internet or on YouTube it will appear, it's a traditional song about Madeira.”

“Avenida do Mar (a street) always reminds me of this one particular song.”

Statements in the interviews, such as those cited above, revealed some interesting insights into the role of social media in establishing group identities and forming social networks. Music came across as an integral part of people's

daily routines and recreational weekend activities. Music also served as a strong expression of the local cultural identity, as also evident during local traditional festivals (Festas populares, Arriais). We got insights into nurtured traditions such as grandmothers singing to babies as well as into lost traditions such as travelling musicians who at one point in time were important channels for communication and entertainment. Music plays a social role in our lives and acts as a resource through which people make sense of a place and its social reality [6]. The interpretations further revealed how personal music consumption formed a mnemonic association with spaces and with people in their lives. Finally, the probes revealed how social media practices served as extensions of face-to-face conversations and vice versa.

Concept: Facebook TV (Saturday Morning Classics)

At least half of the respondents referred to their usage of social networks to mainly post and consume music videos among friends and peers. This inspired us to look in the direction of developing a tool that can foster a social dialogue around special interests. ‘Saturday Morning Classics’ is a micro-site in the form of a Facebook app that aggregates YouTube items of old classic music videos posted on an open Facebook group of the same name. It is an experiment that explores a new interaction paradigm in social television using Facebook. Currently, it has 169 members who have posted more than 400 videos that can be accessed via the group as well as a micro-site with a built-in media player [20]. The group activities triggered social dialogue amongst familiar strangers (friends of friends) around music. The paradigm will be further extended to enable people to play all videos on friends' walls in one place via appropriate filters.

Concept: Place-based Social Playlists

One of the insights we got from the probe returns and subsequent interviews was that people liked to socialize in third places such as bars and clubs with people who had similar preferences in music. Music appeared to be a social glue helping people form social groups around a collective identity. ‘Social playlists’ is a concept that aims to explore the role of music in proximity-based social settings. It intends to be a microsite / app where people can input their phone's Bluetooth IDs and specify music tracks they like to dance to when they go clubbing. When they enter a club with their cell phones, a Bluetooth tracker identifies them and recommends their preferred music to the DJ. If more people using the system enter such a club, the recommendations get more filtered and thus people with similar music taste will start aggregating and meeting up in clubs. Users can also post pictures / album art, dedicate songs to friends, leave comments, etc. on the micro-site attached to specific songs. The interaction between the DJ / VJ and the audience can be thus personalized onsite by announcing these dedications or projecting visualizations of the pictures and comments when a song is played. These projections and music can also be featured on a micro-site that can be accessed by everyone, thus offering incentives

for people to participate in such community-driven experiences.

CONCLUSION

Cultural Probes provided a way to get insights into the local communities. This method helped minimize cross-cultural influences on the inquiry stage of our research and design project and yielded fragmented yet rich biographical sketches and insights into the residents' values, concerns, aspirations, and accounts of everyday lives.

Information versus inspiration

Despite the debates about information versus inspiration as a valid and relevant foundation for design, we found that the two can co-exist when Cultural Probes are approached in combination with follow-up interviews. Many research techniques suffer from a narrow focus, leaving less room for ideation. Adopting a more open-ended and user-friendly research technique, we demonstrate how creativity can be nurtured throughout the research process by valuing the inspirations as well as informational aspects of Cultural Probes. It is evident through our experience that the Cultural Probes facilitate a degree of serendipity in approaching the insights, affording enough room for a creative ideation phase that stays grounded in the cultural context of the end users.

Subjectivity and generality

The process we described in this paper is divided in two phases, shown in Figures 1 and 8, with phase one leading to the design of the probes and phase two involving the tagging and interpretation of the data from the interviews. Phase one started with a framework that, in our particular case, was based on a chosen model depicting the physical, personal, social, and cultural dimensions of place. Through the pilot studies that were designed around these dimensions emerged the three themes of identity, privacy, and security (Figure 1). It is important to state that in this first phase of identifying these themes as key-issues in our investigations we have taken a subjective stance, which, referring to Boehner et al. [2] and Gaver et al. [10], we believe to be justified and desirable in this design research project.

In the second phase we have identified and applied a procedure for tagging and interpreting the data from the interviews that we propose as a generally applicable method for mining the type of data resulting from interviews that are wide open in terms of topics and in fact inviting exploration in unforeseen avenues. The cyclic nature of the method, alternatingly tagging statements from the interviews and querying the statements through these tags, very much fits the iterative process that is characteristic of design. In this project we have experienced that integrating this method in our design cycle helps explore new areas that appear beyond the horizon of the initially discovered design space.

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REFERENCES

1. Aronson, J. (1994) "A Pragmatic View of Thematic Analysis," *The Qualitative Report*, 2(1) <http://www.nova.edu/ssss/QR/BackIssues/QR2-1/aronson.html>.
2. Boehner, K., J. Vertesi, P. Sengers, and P. Dourish (2007) "How HCI interprets the probes," *Proceedings of the SIGCHI conference – CHI 2007*, p. 1077-1086.
3. Ciolfi L. and L.J. Bannon (2005) "Space, Place and the Design of Technologically enhanced Physical Environments," in: Turner, P., Davenport, E. (eds.) *Spaces, Spatiality and Technology*, Springer; p. 217-232.
4. Crabtree, A., T. Hemmings, K. Cheverst, K. Clarke, J. Hughes, and J. La (2003) "Designing with Care: Adapting Cultural Probes to Inform Design in Sensitive Settings," *Proceedings of OzCHI 2003*, p. 4-13.
5. Debord, G. (1955) "Introduction to a Critique of Urban Geography," *Les Levres Nues #6* <http://library.nothingness.org/articles/SI/en/display/2>
6. DeNora, T., "Music and emotion in real time," *Consuming Music Together: Social and Collaborative Aspects of Music Consumption Technologies, Computer Supported Cooperative Work*, 2006, Volume 35, Part 1, p. 19-33.
7. Dey, A.K. and E.S. Guzman (2006) "From Awareness to Connectedness: The Design and Deployment of Presence Displays," *Proceedings of the SIGCHI conference – CHI 2006*, p. 899-908.
8. Dourish, P. (2006) "Implications for design," *Proceedings of the SIGCHI conference – CHI 2006*, p. 541-550.
9. Gaver, W., J. Beaver, and S. Benford (2003) "Ambiguity as a Resource for Design," in *Proceedings SIGCHI conference on Human factors in computing systems*, Ft. Lauderdale, Florida, USA, p. 233-44.
10. Gaver, W., A. Boucher, S. Pennington, and W. Walker (2004) "Cultural Probes and the Value of Uncertainty," *Interactions*, XI(5), 53-56.

11. Gaver, W., A. Dunne, and E. Pacenti (1999) "Cultural Probes," *Interactions*, **VI**(1), 21- 29.
12. Gaver, W.W., B. Hooker, and A. Dunne (2001) *The Presence Project*, London: Royal College of Art.
13. Gaye, L. and L.E. Holmquist (2004) "In Duet with Everyday Urban Settings: A User Study of Sonic City." *Proceedings of NIME'04*.
14. Graham, C., M. Rouncefield, M. Gibbs, F. Vetere, and K. Cheverst (2007) "How probes work," *Proceedings of OzCHI 2007*, 29-27.
15. Graham, C. (2008) "Probes and Participation," *Proceedings of the Participatory Design Conference*, p. 194-197.
16. Grasso, A., M. Koch, and D. Snowdon (1999) "Campiello - New user interface approaches for community networks," *ACM SIGGROUP Bulletin*, **20**(2), 15-17.
17. Rittel, H.W.J. and M.M. Webber (1973) "Dilemmas in a General Theory of Planning," *Policy Sciences*, **4**(2), 155-66.
18. Tuan, Y.-F. (1977) *Space and Place: the Perspective of Experience*. Minneapolis: University of Minnesota Press.
19. Zimmerman J., J. Forlizzi, and S. Evenson (2007) "Research through design as a method for interaction design research in HCI," *Proceedings of the SIGCHI conference - CHI 2007*, p. 493-502.
20. URLs for *Saturday Morning Classics*:
<http://www.facebook.com/groups/saturdaymorningclassics>
 and <http://classicstv.m-iti.org>