

The participatory technique of “Technology Probes”: a case study in Burkina Faso

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ABSTRACT

This paper describes a project introducing a group of young adults from Ouahigouya, Burkina Faso, to the potential uses of Internet services, discovering how these services would impact and possibly change different aspects of their daily lives. Resisting a top-down or technology driven approach, the team adopted a participatory design approach in order to create a more meaningful training course. Technology Probes were introduced in order to understand to what extent freely available Internet service would fit into the local context and what new services and technologies could be generated in accordance to that.

Categories and Subject Descriptors

H.5.2 User Interfaces (D.2.2, H.1.2, I.3.6): User-centered design; Theory and methods; Interaction styles (e.g., commands, menus, forms, direct manipulation).

J.4 SOCIAL AND BEHAVIORAL SCIENCES: Sociology

General Terms

Design, Education

Keywords

Technology Probes, Cultural Probes, Service Design, Participatory Techniques, Developing Countries.

1. INTRODUCTION

Design, and in particular service design (Mager, 2007), is increasingly looking at developing Countries as source of inspiration as well as a context where to develop innovative design processes, services and products (Sihlongonyane, 2003). This is happening because of numerous reasons: organizations operating in those contexts understand the potential of involving design experts in co-operation projects, the increasing availability

of technologies in those places create interesting opportunities for designers to think of new applications and uses (Morelli, 2007), a growing literature about the topic of design in developing Countries constitutes a starting base of knowledge and references for design experts to make informed guesses and comfortably attempt to design for inhabitants of those areas. Finally ethical issues push design to take the challenge of confronting itself with the extreme contexts of developing Countries (Thackara, 2005).

The specific field study and research method described in this paper, took place in Ouahigouya, an urban context in the North of Burkina Faso. The project was part of a broader programme initiated by Co.Co. Pa., an Italian organization based in Torino, geared towards projects of Co-operation including diffusion of food safety, literacy and support of female activities in Burkina Faso (Co.Co.Pa., 2006). The part of the project we were responsible for, was constituted by three main tasks: the installation of an Internet connection through satellite antenna able to support the access on-line of a maximum of 5 computers (i), the introduction to the Internet and its tools to a group of 20 local women and men with age ranging from approximately 18 to 40 years old (ii), the generation of concepts for Internet enabled services (iii) as a base for values-driven businesses (Cohen and Warwick, 2006).

The total time for the intervention *in situ*, was approximately 8 weeks. We soon realised that the time available was considerably short for accomplishing the tasks mentioned above, and this limitation became one of our creative inputs in the project.

1.1 About Burkina Faso

As a developing Country, Burkina Faso's social and economic conditions are severe. Data about life expectancy (53 years, 203rd on 227 in the world ranking) and GDP (1,200\$ per capita, 204th on 227 in the world ranking) (Central Intelligence Agency, 2011) might be representative for the extreme living conditions in this specific African Country. UN rates Burkina Faso as the 3rd poorest Country in the world (British Broadcasting Corporation, 2011). The project took place in the town of Ouahigouya, which is the most important town in northern Burkina Faso. It is the capital of the Yatenga Province and the third largest city in the Country with a population of above 100,000 inhabitants. It is situated 182 kilometres north-west of Ouagadougou.

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These conditions reveal Burkina Faso as an exemplar context for innovation driven research in the area of design and interaction. This is due to the radically differences between conditions in which we as western designers are used to and those presented to us in Burkina Faso.

2. RESEARCH OBJECTIVES

While the project commissioned by Co.Co.Pa. defined a clear task as the introduction to the Internet and its tools to a group of selected local people, our interest as researchers was to explore different ways of designing services and eventually technologies for specific contexts. In Burkina Faso we were given the opportunity to work directly with the new and upcoming generation of users of the Internet, initiated by us to the potential of the Internet connection.

As researchers and designers we went in wanting to investigate the opportunities to use the Internet to fulfil local needs and ambitions, eventually inspiring them to design their own applications and services. We were also interested in understanding the role of the designer as a facilitator and what benefits and concrete results would such a process generate.

Ultimately we wanted to understand how the introduction of a certain technology could be possibly used to explore the cultural and social aspects of an unfamiliar context.

In these regards we have found inspiration in the approach described by Hutchinson et al. (2003) as Technology Probes. In particular we recognized that the ambition of *'understanding the needs and desires of users in a real-world setting, the engineering goal of field-testing the technology, and the design goal of inspiring users and researchers to think about new technologies'* reflected very well the general intent of our project.

Because of the unfamiliarity of the context and its many unpredictable aspects, we found ourselves in the situation of having to detect the best methods while working on the field.

2.1 Methodology of the Burkina Faso case study

Local participants involved in this project had at least basic literacy and numeracy as well as a sufficient familiarity with computers. A few of them had used Internet in cyber-cafes, but none of them had any form of Internet connection (PC, mobile) at home or close by. The relationship between the design team and the participants, during our workshops in Ouahigouya, was really the one of an exchange. The exchange between the two parties consisted in a flux of knowledge: while the researchers would have taught Locals about technologies and services already available freely on the Internet, in return Locals would have conceived and communicated to the researchers possible applications of those resources in the local context. It is worth noting that we were to bring a remarkable innovation to that context: the Internet connection freely accessible to everyone. This disruptive element triggered participants' imagination who immediately and unconditionally thought of some beneficial uses of that technology for themselves and the Community.

In synthesis, our process followed the sequence:

1. capture main individual and cultural peculiarities;
2. provide a new technology or tool;
3. introduce participants to it;
4. let them play with it;
5. ask them what they would do with it;
6. analyze their proposals;

Mainly due to the context, that allowed us to work with existing tools we use daily in our context of provenance such as Google services and VoIP software among others, we didn't have to develop specific technologies or design new artefacts for our activities.

Participants appreciated the fact that our tool for research - the Internet connection - was there to stay and it wasn't removed afterwards. In fact, we believe that the group of Locals never perceived the Internet as a tool for our research, but rather as an opportunity for them to improve their lives and to learn something useful.

2.2 A participatory approach

The cultural, social and economic differences between western researchers and the local participants raised considerably the challenge of designing appropriately for the local context. The challenge is for the designers not to partake in the fallacy of simply deploying services and frameworks for their original western context or imagine designs based on naive assumptions and personal inspirations that ignore the depth and peculiarities of the local context. For all these reasons and for the remarkable time constraints, the research team decided to adopt participatory design techniques (Grudin and Pruitt, 2002) with the triple intent of teaching the local participants about the Internet and its resources (i), learning about the local context, group's aspirations and needs (ii), generating ideas for services (iii).

Being involved in the design process of the local users exposed us to relevant insights of the local culture. Our role, then, was to provide the right amount of information about the technology without limiting the users' creative process. After introducing each on-line resource, we asked *"What would you do with it?"*. By doing so we were pushing participants to think about their community, but also about possible revenue coming from their idea. It was important for us, and for Co.Co.Pa., to have them grounded to something economically sustainable in the longer term.

Technology Probes, as participatory activities, were particularly beneficial in combining the teaching activity with our research agenda. This allowed us to optimize the use of time which represented a big constraint in our project.

3. PROBING

During the field study, we had chance of applying both Technology Probes, which remain the main focus of this paper, and some short activities based on the method of Cultural Probes (Gaver, Dunne and Pacenti, 1999). In the next sections we will describe both methods as we adapted them to this case study. We think that a comparison between the two is necessary to highlight the different typology of information that the two methods lead to.

We will also comment on which method helped us to achieve our objectives in the best way, in relation to the specific context, characteristics and constraints of this specific case study.

3.1 Cultural Probes

3.1.1 Background of Cultural Probes

Cultural Probes (Gaver, Dunne and Pacenti, 1999) is a method for conducting ethnographic research in context hard to access without compromising its peculiarities (i.e. somebody's domestic environment). As the broad literature of case studies seems to prove (i.e. Crabtree, Hemmings, Rodden, Cheverst et al., 2003 or Sejer Iversen and Nielsen, 2003), Cultural Probes are widely accepted and adopted in the context of design research. The method requires the use of tools chosen - and occasionally designed - by the researchers and handed in to the users that, following given instructions, are expected to express aspects of their lives. Results are afterwards observed and interpreted in order to gather useful information and inspiration. During the first sessions of our workshops we envisioned the idea of using Internet searches as semi-structured Cultural Probes.

3.1.2 Internet Searches as Cultural Probes

The first field activities with the group included a basic introduction to searching for information on the web. After having briefly explained how to use search engines, such as Google, we invited participants to freely and publicly operate some web searches. The searches would have revealed something about participants, their interests and, generally, lives. Basically Internet searches on Google acted as a Cultural Probe asking participants: *"What would you like to know more about?"*. The Google homepage opened on a laptop was serving us as a Probe.

During this experiment, we could notice that searches about *"the first president of USA"* were recurrent. After further consulting with the participants we could discover that questions about the first president of the United States of America are a frequent topic during tests to access job positions in the public administration. These questions are used by the employer to verify the general knowledge of the candidates. Other searches included products or pop-stars' and football players' names, revealing local young people's idols and interests. Although these experiments provided us with precious information in order to get to know our participants conditions, needs and desires, we soon realized that interpretation of the gathered data was often overwhelming and covering a broad number of areas.

The pressing need for us was the one of collecting focused information on the areas involved by the technologies and tools connected to the Internet and generate ideas for new services based on those technologies and tools.

The reason why we don't include this activity in the Technology Probes is because it never reached the phase of participatory design. Although participants were excited by Internet searches, it was impossible for us to follow up with any generation of concepts. In our opinion Google searches are a too basic tool, based on a simple interaction between user and machine - intended as the ensemble of algorithms and interface -, that doesn't leave much space for misuses. In response to the results of the Cultural Probes we decided to continue our work by adopting the Technology Probes method, expecting this way to have a better focus on the local context in relation to the technological

resources we were bringing. We needed to probe our participants through the technology we were introducing in order to have a more direct indications towards service and product concepts that were close to the people's needs and context.

3.2 Technology Probes

3.2.1 Background of Technology Probes

Technology Probes (Hutchinson, Mackay, Westerlund et al., 2003), as described by its authors, is a method for collecting information about the use and the users of a certain technology. Technology Probes are not only a tool for gathering information, but also for co-designing with the future users. Its application consists of three main phases: the introduction of a technology to selected users (i), the observation and interpretation of uses and misuses the users make of it (ii), and finally a phase of participatory design in which the researchers try to facilitate the design process characterized by the participation of the users (iii). Users are encouraged to take decisions in drawing future scenarios in which the new technology enables new services, artefacts or even radical evolution of the technology itself. Successively, the whole process is analyzed by the researchers who are expected to interpret the early concepts developed and extract useful insights about the local context. The use of technologies, as well as their evolution, mediates the culture of the context they are embedded in, allowing social and cultural elements to emerge in a clearer manner. In many ways the use of technology as a tool for research acts as a filter that allows only the information more related to that specific technology to stand out. This method can be beneficial in terms of time and energies, especially when applied to unfamiliar contexts.

As Technology Probes we adopted on-line service applications, as they are available to everybody. By doing so we could accommodate the need of introducing tools that are in a way finished, reliable, useful and ready to use for everybody, with our research objectives. We decided then to focus on those resources that enable a new interaction with elements of participants' life. For example, we were particularly interested in exploring opportunities for innovation in the way Locals experience and conceive their own territory, as well as the way they manage interaction with remote contacts. For these reasons we chose to introduce Google Maps and Skype and use them as our Technology Probes.

In the next sections we describe these two practical applications of Technology Probes.

3.2.2 Google Maps as Technology Probes

A couple of days of our activities were dedicated to the introduction of the web mapping service application and technology of Google Maps. This tool triggered the imagination of the majority of the participants. In particular one participant manifested a vivid interest for the tool, claiming that it would have been useful to improve touristic activities in the area. Independently, he decided to reach some sites in and around the town of Ouahigouya, taking pictures with a digital camera and subsequently uploading those images on a Google Map he set up with our help. What seemed to be a conventional idea quickly became an innovative concept, when our participant started including with the description of the site also the name and telephone number of some people. He explained to us that the contacts he was adding to the short descriptions of the locations

belong to people who live in those areas and that are in some cases considered as “gatekeepers” of stories and information not accessible in other ways. He imagined a system where visitors would have been provided with a map pointing out the most interesting spots around. Once on site, the hypothetical tourist could call with his/her mobile the telephone number on the map, and the person on the other side of the phone could offer a remotely guided tour of the site, through the phone, or choose to physically reach the tourist to take him or her around in person. Our participant thought that such a system could generate some revenue for the “local guides” and raise touristic interest in the area.

Although the idea showed some evident technical and practical issues to be solved, such as the way the map would have been distributed and other matters regarding the different languages and dialects spoken by the hypothetical guides and tourists, it was still a very informative and innovative concept.

First, this idea revealed us a layer of site specific information that we were not aware of; second, it opened the possibility to create an innovative set of services, based on the involvement of local people through a digital layer; third, it disclosed a very important cultural element: some people have the role of keeping information about their territory through oral story telling rather than permanent recording.

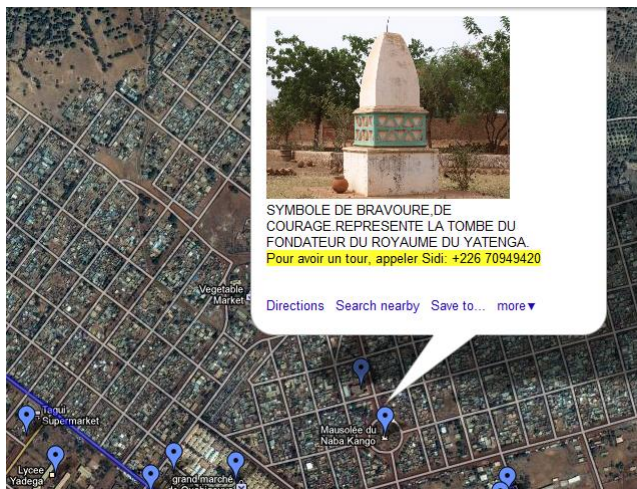


Figure 1. Prototype Google Map with telephone contact of a local guide.

3.2.3 Skype as a Technology Probe

Another example we want to bring here to describe the use of Technology Probes in the Burkina project context is the use of instant messaging and VoIP software as a Technology Probe. Following the process adopted for previous Technology Probe, we first described the use of Skype to the participants, and after some days of testing the tool, one participant in particular came up with an innovative concept. He first observed the importance of having contacts that live abroad, as those contacts represent an opportunity for getting to know a different and appealing culture. Also, in a more practical sense, western friends can result into occasional economic help or a basis for a possible emigration. Quickly the participant realised that Skype doesn't serve well as a tool for finding contacts, but it's rather something to keep in touch with people we know. Thinking about which occasions Locals get to know people living abroad he observed that usually

a relationship is established when a Westerner buys a traditional drum by local sellers. From previous experiences he also learned that Westerners, after some time, don't enjoy playing the drum anymore. Our participant came to the conclusion that this happens mainly out of frustration since Westerners lack of skills in using the African instrument and are unable to reach a satisfying level. He envisioned a combination of the product, intended as the drum, with the Skype contact of the seller or musician, so that, once back to her or his Country, the western customer could contact the local expert for some lessons through video-calls on Skype. Our workshop attendee had thought of combining a product, the drum, with a service, the Skype lessons. He imagined a strategy aiming to get some revenue out of these drum lessons in the longer term, as well as gaining in contacts and personal network.

Also in this case, information provided by this early concept, was telling us a lot about how Locals value contacts with Westerners. It also emerged that Locals would base communication on elements of their heritage, as traditional music can be. All aspects of this early concept were in many ways inherent to the eventual deployment of Skype as a technology. The use of this new technology by the community appeared really as an opportunity to the benefit of the local culture and micro-economy.



Figure 2 and 3. Prototyping drum lessons over Skype with a European customer.

4. COMPARING TECHNOLOGY PROBES AND CULTURAL PROBES

As Cultural Probes, Technology Probes also aim to let potential users depict themselves. However, the peculiarity of Technology Probes is that the all process spins around an element of disruption, as it can be a new technology. The aspect of bringing a novelty in the context of the users is crucial because it triggers participants' imagination and creativity.

The role of the designer becomes the one of a facilitator, helping participants to draw scenarios and articulate ideas, which then are analyzed and interpreted. Cultural Probes are usually applied by designers with a strong focus on the users' daily life, on the present, on their normality, whereas Technology Probes act directly on participants' future projections.

The main differences we could observe between the general characteristics of the two techniques can be synthesized in the following points:

- **CULTURAL PROBES:**
Describe the present;
Depict yourself through normality;
Aim at maintaining continuity of behaviours and context;
- **TECHNOLOGY PROBES:**
Draw future scenarios;
Depict yourself through change;
Aim at disrupting current situation and establish a new set of accepted behaviours and context;

For what we could experience, the real potential of Technology Probes lays in the part of co-design together with the users. In this phase of the probe the most pertinent insights to that technology seem to emerge more strongly. In the context of service design, which is where we operate, Technology Probes proved to be able to identify the potential uses of technology for achieving goals that only the inhabitants of the given context could foresee. In synthesis, if Cultural Probes are a great tool for understanding users and contexts, Technology Probes offer an angle that keeps into consideration future uses of the technology itself, thus narrowing considerably the quantity of information and areas of research.

Extending from Hutchinson et al. (2003), Technology Probes, applied to service design, raise interesting questions about usability and aesthetics of a certain technology, as well as push the users and the designers to business models behind the newly conceived services enabled by such technology. In this sense Technology Probes are a more stimulating tool than Cultural Probes in preparing the ground for co-design between communities of future users and designers.

Technology Probes can be seen as a never ending method as each phase triggers the generation of new technologies and tools that, again can be introduced to the group of participants for a further evolution and new applications, yet generating new technologies or services and so on.

5. CONCLUSIONS

Through our field research we identified Technology Probes as the best tool to raise participants' attention and curiosity. The use of Technology Probes functioned as a spark for innovative

concepts and helped them to draw future scenarios for their applications. The participatory design approach utilised between designers and local users generated a number of concept proposals, which helped the researchers to gather information about the local context.

Technology Probes, applied to service design, resulted in an appropriate tool for achieving the set goals proposed by the research agenda: teaching new technologies and resources, generating ideas and service concepts and learning about the context.

When working in very unfamiliar environments, Technology Probes proved to be very helpful in focusing the research towards the information which is more pertinent with the uses of a certain technology, resulting in a precious tool for researchers.

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