

# CHI WORKSHOP POSITION PAPER ON “USER-CENTERED DESIGN AND INTERNATIONAL DEVELOPMENT”

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## INTRODUCTION

Before I started working on the Text-Free User Interfaces for Illiterate Users project, I had certain assumptions and preconceptions about the way User-Centered Design is conducted. When I joined Microsoft Research India, I was fresh out of graduate school, was trained in design processes and methods and believed in following them to the tee. But in the last 1 and a half years on the project, I discovered that my work required me to immerse myself into the context for which I was designing, go beyond my training, reconsider and see things in a new cultural context.

Text-free User Interfaces for Illiterate and Semi-Literate Users is an application designed such that any novice, illiterate user of first contact with a PC can immediately realize useful interaction with minimal or no assistance. Through an extensive ethnographic study involving over 300 hours and 250 people from urban slums in Bangalore, India, we established several design principles that we believe could be applicable to other user groups that are illiterate and new to computer use. Some of these are eliminating the need for text, using static imagery of unabstracted cartoons, providing voice feedback for all functional units, providing a consistent help feature and using full-context video to dramatize the purpose of the application. Usability test results show that the text-free designs are strongly preferred over standard text –based interfaces by the communities which we address. We have applied these design principles to designing three applications - a job-information application for illiterate domestic helpers, a health information dissemination system for illiterate patients and a map-navigation system.

The project has been a very enriching experience and I have learnt many valuable lessons. I was designing for a target group that did not have any previous exposure to computing technology or formal literacy. There were a number of cultural issues which kept coming up throughout the course of the project. I have spent almost my entire life in India, but the community we were designing for, was unknown turf for me. One of the key lessons that I have learnt in this project is to spend as much time on field and pay attention to the most subtle socio-cultural issues and biases that subjects have. Based on these socio-cultural factors I had to take various actions and adapt user-centered design processes to suit the context. Some of these experiences are mentioned below:

- **Gaining access into target community and establishing rapport:**

To gain access into these communities we worked with a Non-profit organization, Stree Jagruti Samitee (SJS), which has an established presence for 15 years in the five slums where our subjects lived. We held interviews and conducted user trials with our target communities. We repeatedly returned to them to evaluate our designs and incorporated the necessary changes in the next prototype we designed. There were specific challenges which we faced: being accepted and trusted by the community and making the users feel comfortable to talk and extracting relevant information from them. Since there was a stark difference in the economic and social background between us researchers and the subjects, we were held in high regard. We had to take various actions to accommodate subjects and make them feel at ease. We were always dressed in plain and simple Indian-wear, while talking to them we would sit on the ground with them (not on chairs which were offered to us), spent considerable time in the community listening to our subjects' stories, attending weekend meetings to understand the context, culture and practices. For the first few months we had to be always accompanied by the intermediary organization SJS whom the slum dwellers trusted. On average, we visited the communities, two to three times a week, for several months.

- **Helping subjects overcome fear of technology:**

Right from the initial site visit we had started taking a Tablet PC along with us. We noticed that our subjects were scared of wanting to interact with it. They were shy and reluctant to hold the

stylus and draw on the screen. We therefore asked them to draw something they were very familiar with- *the rangoli*<sup>1</sup> on MS Paint and thus were successful in removing some bit of the fear and reluctance.

- **Using participatory design methods to generate gestures for graphics of UI:**

It should be noted that this design step was essential for the experiment. There were differences in the way we, as designers, thought certain words and phrases should be depicted, and the way they were actually depicted by our subjects. As an example, in the health application, to depict the symptom “weakness,” we imagined a man feeling dizzy, holding his head, and possibly fainting. But, the participatory design exercise revealed a different depiction: across the board, our subjects identified weakness with physical pain in the limbs. In retrospect, this is consistent with the fact that their daily occupation involved hard physical labor. Two techniques were used to elicit the appropriate gestures from our subjects:

- a) 2D paper cut-out dolls: The limbs of these dolls could be manipulated. The participants of the exercise were asked to depict a given symptom using these paper dolls.
- b) Enacting: The participants were asked to enact the given symptom without using verbal communication.

- **Representing religious, social and cultural affiliations in the design:**

Some times, differences in religion or culture caused different interpretations of graphical elements. We observed this in designing the job-information application. For example in representing work-timings, we saw that probably because Urdu is written from right to left, Muslim culture views time as flowing from right to left by default. Where we display work schedules, this required an explicit arrow between our start and end clocks faces, so that there was no misunderstanding. See Figure 1.

Some of our initial icons were not interpreted the way we expected. For example, our initial graphic for a residence is shown in Figure 2 (left), what we thought was a universal symbol for a house. Our subjects, however, perceived it as a village hut and were confused, because they expected that prospective employers would live in a tall apartment complex; with their feedback, we redesigned this logo as shown in Figure 2 (right).



Figure 1. Ambiguity in iconic representation due to cultural biases: Our initial design indicating start and end times for a job places the start time at left (left). This is misinterpreted in Muslim culture. Adding an arrow avoids this problem (right).



Figure 2. Designs for the “residence” icon. Our initial design (left) was perceived as a hut; the final design (right) is more in line with what our subjects interpreted as an urban residence.

- **Creating a conducive environment for usability testing**

In traditional user studies, subjects are generally familiar with computers and live in economic conditions similar to their testers. Because of this, tests can be conducted in usability labs with controlled environments, and little attention needs to be paid to the mental comfort of the subjects. In our case, however, our subjects were not habitual users of PCs, and more importantly, they were drawn from communities that often fear testing of any kind and find air-conditioned office environments alien and possibly intimidating. Thus, we needed to make a number of modifications to ensure that subjects were as comfortable in the environment and testing scenario as possible. First, in all cases, we performed the testing in a physical setting which was routine for the participants. In most instances, we visited subjects in their own homes or the office of the Non-profit organization SJS. Second, for all of our participants, we reached out through contacts whom they trusted, and who were in almost all cases, present through the duration of the study. Third, while most users studies tend to focus on isolated tasks, we found this was inadequate, as subjects had a poor understanding of the capacity of the computer

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<sup>1</sup> Rangoli is a form of decoration that uses finely ground white powder and colors, and is used commonly outside homes in India.

overall, and almost no sense for what kind of tasks could be accomplished. We used a methodology termed the 'Bollywood Method', in which tasks are embedded in dramatized stories involving the subject, which has been found to be better at motivating subjects toward the desired tasks.

- **Laying context to the UI application through established traditions of instructions**

We observed that in spite of our subjects' understanding of the UI mechanics, they experienced barriers beyond illiteracy in interacting with the computer: lack of awareness of what the PC could deliver, fear and mistrust of the technology, and lack of comprehension about how information relevant to them was embedded in the PC. We addressed these challenges with full-context video explaining the broader context of the application. This video in our opinion is the greatest break-through in this project. The video included dramatizations of how a user might use the application and how relevant information comes to be contained in the computer, in addition to a tutorial of the UI. The introduction of full-context video dramatically improved task completion for a job-search task in the job-information application resulting in 100% task completion. Through our ethnographies of the target community, we knew that many had television sets in their houses and that they regularly watched soap operas and movies that were aired in the local TV channels. It was evident that dramatized video was a familiar medium of communication. Traditional instructional videos which we had initially designed consisting of an over-the-shoulder shot, in which live screenshots illustrated use of the application, was of only marginal benefit in task completion. We understood that it was more important to explain the broader context of the application and hence designed the full-context video.

## **CONCLUSION**

In my last 1 and a half years on the project, I have realized that user-centered design for development requires innovating techniques continuously on field and tweaking processes to fit the context that one is designing for. I hope other participants of the workshop will provide their own experiences and through discussion, the workshop can create a repository of such experiences and initiate something like a "field guide" for this design community.