Sustainability and a Global Design Process

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Abstract: The path to sustainable development is best elucidated when issues of sustainability are addressed in a global context. As the reach of the world economy continues to extend across national borders, an important measure of a Design's sustainability will be its ability to be useful, desirable and relevant internationally.

This paper details the process and results of a recent collaboration sponsored by Honeywell Technology Solutions, Bangalore between Design students from the Indian Institute of Technology (Mumbai) and the Illinois Institute of Technology (Chicago), who worked together on a global design project. Students in this course used a human-centered design process to develop and prototype products, services and business models based on an understanding of the needs of small business owners in two neighborhoods - Pilsen/Little Village in Chicago and Powai in Mumbai. The project began with IIT Chicago students doing research in the Mexican neighborhoods of Pilsen and Little Village, while IIT Mumbai students did research in a slum area in Powai adjacent to the university. Students then exchanged research, with the result that Indian students ultimately designed products for 4 small businesses in Chicago, and Chicago students created designs targeted at small businesses in the Powai slum. The success of the human-centered process applied in an international context both validated the methodology and resulted in sustainable design concepts.

Keywords: Remote research, human-centered design, remote collaboration, BoP, sustainability

1. INTRODUCTION

This project was set up to further explore the practice of remote research and international collaboration between designers. It focused on small business communities and their use of social networks as a mechanism for economic development.

Students were divided into four paired groups (eight teams of three to five students per team). Students worked on a total of eight different projects based on shared collections of research data from each neighborhood.

The collaboration between IIT Mumbai and IIT Chicago featured Chicago students directing research in Powai, and IIT Mumbai students directing research in Chicago. As a result, research approaches were tailored to each group of students' needs. IIT Mumbai students focused on physical product design solutions and IIT Chicago focused on designing systems and strategies encompassing combinations of product, communication and service design opportunities. The goal of all of the projects was to contribute to increasing prosperity and small business growth within Chicago and the Powai neighborhood.

This paper will discuss a subset of results from this research collaboration, focusing on the findings and design ideas for the Powai neighborhood and the effectiveness of the remote research methodology within the context of sustainability.

2. METHODOLOGY

Students employed a human-centered design process in the formative stages of the projects discussed in this paper in order to gain insight into people's behaviors, unmet needs and design opportunities.

2.1 Remote Research

Remote research is an applied ethnography approach that utilizes local resources to carry out field research directed from a remote location. Similar to ethnography, it relies on open-ended questioning and close observation of daily behavior. Remote research allows for rapid data gathering with minimum cost. Supported by modern digital technologies, it allows for highly visual documentation and compelling data immersion for the remotely located team, as well as potential stakeholders.

Based on preliminary knowledge about targeted neighborhoods provided by their remote research partners, and complimented by secondary research, each group students designed a research protocol to be executed in a remote location. To gain insight into the routines, behaviors and attitudes associated with small business communities, students used various research methodologies; in-context interviews, photo and video observations, sketched floor plans, relationship diagrams, etc.

2.3 Remote Behavioral Prototyping

Behavioral prototypes are three-dimensional experiential simulations of products, environments or systems, which can be interacted with and critically observed during research sessions. The process is about taking a design idea out in the early stages of development and placing it in a real world context. Key learning comes from the interpretation of user behavior rather than tallied results. Similar to remote research, remote behavioral prototyping can utilize local resources to carry out sessions remotely from the design team.

Based on consideration of critical aspects of the design concepts, each group developed tailored behavioral prototypes and companion instruction sets for their counterparts. Digital prototypes were then remotely constructed and executed by their remote research partners.

2.3 Remote Collaboration

In addition to carrying out field research and prototyping, a crucial role of the remote research partner is to provide cultural coaching and consultation. This was done by both groups of students involved in this project.

3. RESULTS AND DISCUSSION

In this section, the results will be discussed from two perspectives:

3.1 Effectiveness of the remote research collaboration
3.2 Key insights and design ideas derived from the collaboration.

3.1 Effectiveness of the Remote Research Collaboration

The following successes listed by IIT Chicago students in their final presentations indicated that the remote research collaboration was effective:

- Data received validated some of assumptions and some were proved wrong.
- Insights derived by the IIT Mumbai students from the Chicago data focused on physical processes and less on behaviors and perceptions (as with their IIT Chicago counterparts). This highlights the versatility of the remote research approach.

While the following challenges had to be overcome during the course of the collaboration:

- The research methodology practiced by the IIT Chicago students was new to their Indian counterparts.
- Coordination of deliverables and deadlines were difficult and as a result, prototypes were not adequately tested.
- Communication and cultural differences had to be overcome.

3.2 Key Insights and Design Ideas

As a result of the collaboration, there were 4 areas of insight and new design ideas that were explored by students:

3.2.1 Exploring the possibility of for-profit and not-for-profit hybrids

Students explored the creation of for-profit/not-for-profit hybrid organizations by designing systems that:

- Empower women using existing social networks
- Strengthen communities by connecting local resources.

The following 2 projects illustrate this:

- **Project A: Balwadi**
  A self-sustaining business model for a Balwadi (a community-based play school, pre-school & coaching centre) that integrates a non-for-profit community service provider, a for-profit entity and an educational incubator around the core values of creating social and economic value for the Powai slum community.[1]

- **Project B: Kitty Cooperative**
  A model for women's groups in the Powai slum designed to make NGOs more effective in addressing the needs of their constituents in the areas of health, education and financial independence. Students designed systems that enabled women to convert free-time activities into ones that generate income for them and their families.[2]

3.2.2 Utilization of Ubiquitous or Predominant Technologies

Students designed record-keeping and credit management systems for shopkeepers in the Powai slum.
New paper ledgers and record-keeping applications for mobile phones addressed the preponderance of credit-based transactions, unclear payback details and the shop owner's monopoly of the main register in these stores.[3]

3.2.3 Exploring New Types of Currency

Students designed a multifaceted, efficient scrap collection system for the Powai neighborhood. This system offers increased efficiency and profitability to Powai scrap collectors by facilitating networking, scrap processing, price transparency and the introduction of incentives.[4]

3.2.4 Cross-Cultural Design Language

Students in Bombay designed display fixtures and commercial furniture for a crafts shop in the Mexican neighborhood of Pilsen (Chicago).
The goal of this design exercise was to create a group of products with a cross-cultural design language aimed at increasing appreciation of local arts and culture, facilitating the shopkeeper's role and improving the customer experience in a local crafts store .[5]

Two other groups of students in Bombay designed tools to support street vendors' businesses in Pilsen. A street cart for a tamale vendor[6] and a mobile van vendor's display and storage system[7] were designed to support mobility, quick and easy setup, as well as vendors' interactions with customers. These designs introduced unique functionalities to product systems designed specifically for mobile vendors.

A fourth group from IIT Mumbai focused on a small bakery business, and designed a set of baking tools based on an understanding of different food categories and preparation processes used there.[8]

4. CONCLUSIONS

The remote research and collaboration discussed in this paper demonstrate the value of research in the design process as using it enabled students to effectively design for users living in another part of the world. This was confirmed during the prototyping phase, when a number of design concepts were endorsed and accepted by organizations and targeted users in both India and the United States. This outcome supports the notion that collaboration by designers on international projects increases the overall sustainability of Design.

Set up as an academic project, students were working under several constraints and with limited resources, such as: rigid academic calendars, challenging local and remote team collaborations, limited time and accessibility, etc. In a professional consulting context, the above circumstances may be less of an issue, allowing for the possibility of increasing sample sizes of research subjects, arranging faster and more flexible accessibility, and improved overall collaboration.

Learnings from this research exercise can be used as the foundation to develop and improve tools and processes for remote research as follows:

1. Establish a common context and approach that is agreed upon by all teams participating in remote research.
2. Co-create protocols with input from all teams.
3. Create and adhere to a single schedule.
4. Address cultural differences that affect communication.
5. Manage time zone differences democratically.
6. Use teams of 2-3 individuals in favor of larger groups that are difficult to manage in the field.

5. ACKNOWLEDGMENTS

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