

Panel (D-MAD-II): Design for Making a Difference (D-MAD): Institutional Context and product Design

Total Papers: 9

Chair:

Aguinaldo dos Santos

Head of the Design & Sustainability Research Center, Federal University of Paraná, Brazil

Co-Chair:

Ravi Poovaiah

IDC, IIT-Bombay

Time: 14:00-15:30, 16:00-18:00

Venue: Wing-11, Committee Room

1.

Organizing grassroots design: Epistemic practices employed by members during the design of technological innovations within grassroots communities

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Design for development researchers have neglected to theorize the role or potential of the members of communities where development projects are implemented to participate not only as users and appropriators, but also as designers and developers of innovative technologies with positive social and economic outcomes. By recognizing the agency of community members, scholars may recognize and balance asymmetries in organizing and communicating knowledge during the design and use of technology, within and across scholarly and grassroots communities. My intention is not to replace one dichotomy (local-global) with another (local-scholarly), but rather to reconfigure the relations between researchers, designers and the communities they engage with, by observing design practices underlying technological artifacts produced at the *grassroots*, by individuals and groups within knowledge-rich yet resource-poor local communities (Gupta, 2006; Gupta, Kothari, & Patel, 1999).

Contemporary design scholarship has also articulated and problematized analytical distinctions between the local and global (Shklovski et al., 2010; Vertesi et al., 2011), problems versus values (Burrell & Toyama, 2009), and interventionist versus non-interventionist forms of research (Dearden, 2012). Yet, a shared analytical distinction between designers and users of technology continues to characterize design scholarship and practice in the realm of development. Viewing technology design and use as discrete, mutually exclusive activities prevents researchers from acknowledging the mutually constitutive role of the material features of technology in organizing use, and the role of community-level organizing in informing the development and use of technologies.

Members of grassroots communities frequently engage in designing and developing novel technological solutions for locally occurring problems. Such novel technologies, which initially emerge through the independent efforts of individuals and groups from communities operating at the grassroots level of organization, may be referred to as *grassroots innovations*

(Gupta, 2006; NIF, n.d.). Grassroots innovations may serve as vital points of entry for researchers who are interested in examining the connections between local design practices, norms and values, and the material environment (Vertesi, Lindtner & Shklovski, 2011, p. 62).

I report learnings obtained from innovative artisans, agriculturists, and entrepreneurs who are collaborating with the Honey Bee Network (HBN) – a local, national and global network of innovators, agriculturists, scholars, policy makers, entrepreneurs and non-governmental organizations (NGOs) engaged in organizing grassroots innovators and holders of traditional knowledge. A combination of interviews, guided conversations, and ethnographic methods of observation and participation were employed to study practices underlying the design, development, and use of technological innovations across seven rural, semi-urban, and urban communities in Gujarat state. Here, I focus upon the communicative interactions between innovators, their collaborators, and their social and physical environment during the design, development and use of grassroots technological innovations.

I present that innovative grassroots technologies are organized around specific epistemic practices associated with articulating and sharing knowledge. Such epistemic practices are simultaneously conceptual tools and observable phenomena (Knorr Cetina, 2008). While scholars (Dodier, 1995 in Knorr Cetina, 2008; Pickering, 1995) have expended considerable time and effort studying subject-object relations in formal science, less work has taken on the task of understanding how objects of knowing remain incomplete and emergent in their partial nature outside of scientific laboratories. Directing our attention to grassroots innovators, we can ask: *How can incompleteness and emergent attainment of material form be understood by observing the epistemic practices of grassroots innovators?* As this submission demonstrates, grassroots innovators employ epistemic practices which generate representations that are always in physical and functional approximation to the expected use. Furthermore, in reiterating rather than eliminating lack, these practices suggest that innovators' employ epistemic practices which reflect the social and material environment in which grassroots innovations are designed.

The epistemic practices of grassroots innovators may be conceptualized as routine or creative practice, and are representative of their ability to negotiate incompleteness or lack in the objects they design and use, and the environment where such design is carried out. Such incompleteness helps innovators extend routine practice in new directions. Grassroots innovators express the need for innovative design in terms of a perceived responsibility toward their local communities. Grassroots technologies may be understood as incomplete artifacts whose embodied design is based upon reflexive, empathic naturalistic observations of user needs and material constraints and availabilities, and the incorporation of such observations into broad tolerances that are continuously refined as the design is adapted for different use cases.

Design unfolds via a collaborative practice of substitution enacted by actors who constitute an innovator's social network. Substitutive practices of collaboration involve the substitution of a person across different roles or the enactment of a role by multiple individuals

They may, for instance, be observed when a resource is distributed across many people or when a single person provides access to multiple or diverse resources. The communicative articulation of substitution as a collaborative practice occurs as *madat* (assistance or aid) and *sahayog* (empathic cooperation among members). The innovator participates across different groups and communities, and the relative symmetry (or lack thereof) of his interactions with

members who enact substitution when providing resources is indicated by the discursive articulation of such support through *madat* and *sahayog*.

While *madat* and *sahayog* are not mutually exclusive articulations of substitutive practices of collaboration, innovators seeking *madat* typically seek immediate, instrumental resources whereas *sahayogi* innovators appear focused on attaining longer term personal goals and community objectives. We may describe *sahayogi* innovators as individuals on a journey over which they participate in and nurture cooperative practices within the community.

The objective through *sahayog* is to institutionalize general standards of cooperation that are applicable to members of the community. Individuals are socialized into and held to these standards when cooperating both during and outside the process of design. The products of such cooperation are measured not only in terms of their functionality or aesthetics but also for their ability to become a common good. Thus, designs are common goods even though a single innovator and his collaborators are most involved in their development to the greatest extent. Cooperation between individuals working on the innovation follows the general principles of empathy, equity and respect which are adhered to by the community.

2.

Design of an efficient and ergonomic bangle-making furnace and tools

Davinder Pal Singh, Shrey Gulati, S. K. Saha*, M. R. Ravi, Sangeeta Kohli

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This paper presents the innovative ideas related to improving both the performance of bangles-making furnace and the working conditions of the artisans making bangles. The focus is on modification of bangle-making furnaces being operated in the Bharatpur district of Rajasthan, India. The traditional furnace in use in this region uses powdery agro-waste as fuel, and is inefficient, polluting and non-ergonomic, although it has been modified over the years by the artisans themselves for better performance. However, the problems of inefficient fuel combustion, very high working temperatures around the furnace, discomfort in handling the tools, and health problems due to smoke and the working posture have been persistent. After the addition of a chimney to the furnace by an NGO, LUPIN foundation, the smoke could be taken out of the working area but other problems were still left unaddressed. The Rural Technology Action Group (RuTAG) IIT Delhi has taken the initiative for finding solutions to these issues. The furnace has been redesigned for higher efficiency and drastic reduction in smoke with the use of briquetted fuel on a grate, a compact combustion chamber and controlled air supply. The foldable ground chairs have been adapted for the use by the artisans considering the ergonomics of the operation. Improvements in the tools have also been devised to reduce the discomfort in their handling. The approach is to design a system which will be acceptable to the artisans, through periodic feedbacks from them and incorporating the same to arrive at a better design.

3.

LOW COST TECHNOLOGIES FOR COLD ARID DESERT

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Defence Institute of High Altitude Research (DIHAR), a constituent laboratory of Defence Research & Development Organisation, is the only one of its kind situated in Leh-Ladakh at an altitude of 3,500 m above MSL, having core competence in cold arid agro-animal technology in the world. The laboratory was established in 1962 after Indo-China war for making hostile terrain of Ladakh reasonably green and productive which would not only sustain its sparse population but also the troops deployed in trans-Himalayan region, in general and Ladakh sector in particular.

Leh-Ladakh is a cold, arid desert having a very harsh climate and remains in a landlocked condition for six months during winter, along with lack of oxygen and heavy snowfall leading to a very short agricultural season. This region is characterized by extreme, low precipitation, very low humidity, high UV-radiation, high wind velocity and a highly permeable immature coarse textured soil. Thus, the region poses major challenges for sustainable agro-animal production.

DIHAR is actively engaged in scouting the local traditional technology/knowledge and has validated them scientifically and after value addition, transferred them to the state agriculture department and farmers.

Different endeavors of DIHAR are leading Ladakh towards a self-sustaining economy by conservation and holistic use of high altitude natural bio- resources. The major contributions of DIHAR for augmenting fresh food supply in Ladakh are discussed like:

- Greenhouse technologies
- Increasing fruit production
- Veterinary sciences
- Post-harvest technologies and marketing

4.

The Himalayan Ecology Project

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The Himalayan Ecology Project began with the Industrial Design Department partnering with the Deer Park Institute, located at Bir, in the Kangra District of Himachal Pradesh. In mid-February, faculty members and students visited the region to document and gain insight in rethinking design of products, processes and systems for communities in the Himalayan region.

They further worked towards finding design opportunities and gaining strength in creating and developing green design practices, creating innovations towards sustainability and

reclaiming, recognizing and reviving local traditions. Water purification by design, passive heating, up-cycling of non-biodegradable waste and its management, tapping energy from natural resources, developing eco-livelihoods, creating products for sustenance of local traditions, means to generate livelihood from revival of local knowledge systems to curb migration of local youth were identified as potential areas where design could make a meaningful impact.

This exercise involved brainstorming with experts from the region, ideation by creating mock-up models and detailing to create a design proposition. The outcome has been 16 rooted and grounded design solutions that stem from the ecology of the region, using materials and processes prevalent locally and that generate employment opportunities while integrating with the existing style of living of the community.

5.

Using Fuzzy NPV for Appropriate Technology Project Valuation in Indonesia

(Case Study: Small Holder Coffee Processing Industry Development in Belu, East Nusa Tenggara)

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Indonesia is the biggest third coffee exporter in the world after Brazil and Vietnam, but the majority volume of coffee export from Indonesia is in coffee bean form. Almost coffee production in Indonesia is dominating by small holder plantation. East Nusa Tenggara (ENT) is one Province in east Indonesia region which high produces coffee bean, but coffee farmers in ENT is still in high poverty level. To increasing coffee farmer income in East Nusa Tenggara, it is needed coffee bean processing to other product so could increasing added value of coffee bean commodity. Coffee bean processing involved several activities from on farm activities until processing the end product to the customer. The main activities in coffee processing in Belu regency, East Nusa Tenggara province were preparing on farm means as input, then on farm activities, post harvesting, primary processing (product: dry coffee bean), collection, secondary processing (product: coffee powder, coffee mix (sugar, creamer etc.), collection/wholesales, distribution, and customer. Our study was focus on introducing to entrepreneur how to process coffee mix and how to use full color paper-metal sachet as primary packaging at local community coffee farmer to increasing their income. The innovations in this process were mixer powder utilization, packaging equipment utilization, and full color paper-metal sachet utilization as primary packaging. To implementation this project as appropriate technology project, we used Fuzzy NPV to valuation this investment technology project as small business investment. Then we make a budgeting estimation in operational planning when we designed this project. The result of this research showed that the investment of technology was feasible, indicated with positive NPV value. In the project implementation, basically the local coffee producer community could accept the process technology, but we had several obstacles when we were introducing the innovation to the local community. There were restrictiveness knowledge and skill of the local community about secondary coffee processing technology, but with personal approach and continuously training we could solve this problem.

Keywords: appropriate technology, fuzzy NPV, small holder coffee, project valuation, SME development

6.

Involvement of Design Values, knowledge and process for Grass root innovators to create market able products

Umang Shah

Sr. Industrial Designer

L U M I U M

It has been observed that innovations/prototype at grass root level create a very interesting buzz amongst different levels of society. However, very few of them pass through the different phases of product development to arrive at the stage of mass manufacturing and mass acceptability. We would like to showcase here with different case studies of how involvement of design process, design values and design knowledge can transform just an idea or a proof of concept by grassroots innovators into a manufacture able product that can be adopted by masses

7.

Case study: Giving voice to the farmers, machine operators, local service providers and small scale manufacturers in designing scale-appropriate agro-machinery for Rural Bangladesh

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This case study describes the Human Centered Design (HCD) approach adopted to re-design a two-wheeled power tiller (2WT) based agro-machinery, Bed Planter (BP), suitable for low-income farmers possessing small farms, less than a third of an acre, in South of Bangladesh. The HCD process attempted to rope in the voices of farmers, machine operators, local service providers (LSPs) and small-scale manufacturers in not only ascertaining their current difficulties, needs and aspirations but also in the design of the machine. The HCD process also took into account local small-scale manufacturer's manufacturing capabilities and ways to enhance the same so as to enable local manufacturing of the product and create employment opportunities thereby. In short, it describes an attempt to collaboratively work with the grassroots, build empathy and co-design. The case study describes the semi-structured interviews, contextual inquiry, co-creation workshops and mock-training sessions conducted with all the involved value chain actors and the learning made in the process. The assignment is part of the project Cereal Systems Initiative for South Asia "Mechanization and Irrigation (CSISA-MI). CSISA MI is a project partnered by International Maize and Wheat Improvement Center (CIMMYT) Bangladesh and International Development Enterprise Bangladesh (iDE-B) and is funded by the USAID Mission in Bangladesh under President Obama" Feed the Future (FtF) Initiative. The assignment used the BP developed by Bangladesh Agricultural Research Institute (BARI) and it's reverse engineered version by a local workshop owner as the starting base.

Keywords: Human Centered Design, scale appropriate agro-machinery, bed planting, small-scale farming

8.

Crowdsourcing Transparency for Indonesia Presidential Election

Elisa Sutanudjaja

(Kawal Pemilu's administrator, Open Data Evangelist and Urbanist)

During the last president election in Indonesia, there were some doubts on the fairness surrounding the election process. Then several citizens initiated various types of crowdsourcing platform to enable other citizens and volunteers to enter and/or monitor election process and calculation. Some of them created a platform that enables fellow citizens to enter digitised data of the scanned result from the voting booths. The highlight of this initiative is KawalPemilu.org, when eventually they managed to finish election results counting one week earlier than the official results and only differ by 0.14%. This grassroots innovation succeeded to return and build the trust of the people on the election process and the Indonesian National Election Committee (KPU). This initiative is important because it marks the beginning where the people become the subject on the election process. Not the government, but the lay people who campaign on how people can guarantee the fairness of the election. In this exposition, we present the insight of the platform and hopefully can share it to others.

9.

A study of ethical issues concerning doctors, pharmacists and pharmaceutical representatives in the Indian health care industry

Anula Gupta

The Paper which I shall be presenting is based totally upon the Research progress made by me as part of the Research Synopsis for the purpose of Ph. D Registration. I have mentioned in brief the main highlights of My paper titled A STUDY OF ETHICAL ISSUES CONCERNING DOCTORS, PHARMACISTS AND PHARMACEUTICAL REPRESENTATIVES IN THE INDIAN HEALTHCARE INDUSTRY. I aim at putting My Paper across in a manner which will provide a guiding light to the Healthcare professionals across the globe. I am interested in giving a suitable shape to My Research Work in future such that it is a veritable boon to the society.

The Indian Healthcare Industry is at crossroads when it comes to the ethical aspects which govern it. When a patient goes to a Doctor He / She is surprised to find that the Doctor in question is treating Him / Her mechanically without being aware of the patient's needs and without keeping hygiene during examination thus causing the patient to become prone to cross infection ! Moreover the Doctor does not extend loving care to the patient and leaves the patient asking for a human touch.

I have tried to touch upon many such ethical drawbacks facing the Medical Fraternity and have tried to do justice to the Doctor- Patient, Pharmacist-Patient and Doctor-Pharmaceutical Representative interfaces in a way which will bring out the lacuna in Medical Profession openly and objectively.