Panel (D-MAD-I): Design for Making a Difference (D-MAD): Devising Sustainable Solutions for Low Income Communities

Total Papers: 7

Chair:
Shashi Buluswar
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Co-Chair:
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Discussant:
Chintan Vaishnav
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Time: 14:00-15:30
Venue: Wing-11, Committee Room

1.
Design for Multiple Life Cycles: A teaching-learning pedagogy for designing products for multiple life cycles

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In this work, an effort has been undertaken to imbibe a culture of "Design for Multiple Life Cycles" to maximize the utility of resources used in developing a product by planning its multiple life cycles during its design stage. At the end of a product's life cycle, some features of form and materials still serve their functionality. Our goal is to develop not only the product but also product semantics. The life cycle of a product starts as soon as it is shipped out the factory where it is created. It is advisable that at every stage, the user should identify the new use of the product rather than buying completely a new product for a purpose. In this work, for a product, the designers are required to identify the users, various context of use of the same product and then redesign it so that the user can identify the next use of the same product after completion of one task. The materials for design solutions are strategically considered so as to be recyclable even after completing all desired life cycles, it is originally designed for.

Keywords: Design for Multiple Life Cycle; Sustainable Design; Cradle to Cradle Design; Redesign; Design Education

2.

Between open hardware and grassroots innovation: The case of the Global Village Construction Set

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This paper presents the case of the Global Village Construction Set (GVCS), a project which operates in a space that might be defined as 'grassroots innovation' while drawing on the protocols, practices and rhetoric of the open hardware movement. We reflect on the role and place of users in design, technology, and innovation practices and systems to interrogate the case of the GVSC, and ask: where and who are the users in grassroots innovation? How do you design around them? What does this tell us about the limits and elisions of current grassroots innovation approaches?

Current scholarship defines grassroots innovation as that comprising 'novel, bottom-up solutions … that respond to the local situation and the interests and values of the communities involved' (Seyfang and Smith, 2007: 585); and which differs from market-based innovation in terms of context, driving force, organisational form, and resource base. Recent work has emphasised the localisation of knowledge and competencies, with Ornetzeder and Rohracher (2013: 7) looking to the composition of structural resources (traditions, practices, networks) to explain 'why grassroots innovations emerge and grow only in specific territorial spaces'. Within these debates, however, questions about the role, identity, and engagement of users in the development of grassroots innovations remain. These issues have been picked up in other arms of the technology and innovation literatures. Within innovation studies, for example, the body of work on user-led innovation (c.f. von Hippel 2005) in which users can actively engage in aspects of the innovation process, either through localised activities, or as part of a dispersed community of practice that makes use of digital tools and platforms to co-ordinate activities. In science and technology studies (STS), scholars including Oordshoorn and Pinch (2005) have probed how the identity and behaviour of users are constructed by designers and technologists, and argue that the separation of users and technologies is something imposed by researchers. Here, we bring these two bodies of literatures to bear on the case of the GVCS, so as to interrogate the place, space and role of users within grassroots innovation theory and praxis.

The primary aim of the Global Village Construction Set is the development of sufficient documentation and schematics to enable the easy fabrication of fifty modular, self-contained 'industrial machines that it takes to build a small civilization with modern comforts' (Open Source Ecology 2012: 4); something which recalls the appropriate technology movement of the 1970s (Smith 2013). Open source communities are often presented as classic forms of distributed user-led innovation (Lakhani and von Hippel 2003), and GVCS is framed by its creators as 'the natural intersection of the open software and open hardware movements' (Thomson and Jakubowski, 2012: 53), with this interpretation appearing to apply to a consideration of the users both as active participants and financial and knowledge resources

in the project. Whilst market-based innovations derive income from commercial activity and rent, the resource base of grassroots innovation tends to comprise some combination of grant funding, voluntary input, mutual exchanges, and limited commercial activity. (Seyfang and Smith, 2007) In their efforts with the GVCS platform, Open Source Ecology have secured resources through a combination of grant funding, project-specific crowdfunding, and small, regular donations; and, inspired by Kevin Kelly's essay on 'true fans' (Kelly, 2008), launched a campaign to enlist the support of 'at least 100 people – who commit to support our work with $10 per month for the next 2 years.' (Open Source Ecology, 2009).

Participants also actively contribute to the design of the project, openly documenting its business models in a way which its founders deemed to be 'transpos[ing] existing software development paradigms to the physical world.' (Thomson and Jakubowski, 2012: 60) Yet throughout this process, the GVSC is notable for the invisibility of its end-users, except in the broadest and most generic terms. Where questions of use are addressed, this invisibility is framed as a strategic asset shoring up the platform's claims to universalism, with the toolset framed as sufficiently resilient and flexible to be 'independently adapted for the American farmer, the African technologist, or the pioneering lunar colonist' (Thomson and Jakubowski, 2012: 53).

Exploring the GVCS's development and underlying principles, we interrogate the processes, spaces, and politics of collective and collaborative action, with particular focus on the role, identity and location of an innovation's users. Read through a heuristic of context, driving force, niche, organisational form, and resource base, the GVCS can be clearly classified as a grassroots innovation. Through its supporters, geographies, and inchoate end-user base, we argue that the GVSC is a far more complex proposition than current definitions of grassroots innovations can accommodate.

Firstly, the GVCS's 'social system' reflects a growing influence of technologically-mediated (and spatially distributed) communities of interest and practice, as something distinct from geographically-localised groups meeting a social need – that which Seyfang and Smith (2007) cite as the fundamental unit of grassroots innovation. Similarly, with GVCS supporters and 'true fans' blurring the roles of funder, participant, and potential end-user, this case study again diverges from descriptions of conventional grassroots innovation, appearing closer to extant models of market user innovation which draw in users who participate out of altruistic motivations, but are ultimately framed as a low-cost source of R&D (Ritzer and Jurgenson 2010).

Finally, the absence of specific end-users from the GVCS's top-line discourse sustains the flexibility of the individual machines, evading premature closure through the perpetual deferral of decisions about appropriate contexts and use cases; which are passed on to an under-determined future user. Where open hardware is – at least partially – a reaction against the presumption that expert knowledge elites are the only relevant participant in technology' (Smith 2005: 109), the GVCS platform has marshalled a wide and diverse array of users, supporters, and active contributors, each playing key roles in the development and day-to-day functioning of the platform. These participants may not be a knowledge elite, but nor are they a homogenous mass of end-users, as recognised by the existing innovation literature. Instead, their role and activities are deliberately undetermined: equally likely to be laying down

infrastructure and schematics for some undefined user as tailoring the GVCS's tractable plans and blueprints to their own particular needs.

With an eye to the combined impact of geographic dispersal, a greater diversity of stakeholders and modes of participation, and an ambivalence towards the end-user, any effective analysis of the GVCS – and by extension, grassroots systems which use technologies of collective authorship to marshal and coordinate dispersed communities of practice – must be able to account for 'the multiplicity and diversity of users, spokespersons for users, and locations where the co-construction of users and technologies takes place.' (Oudshoorn and Pinch, 2005: 24).

3.

Green Technology for Clean Pond

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Background: Most ponds in our locality created long back for the main purpose to collect rain / storm water. It has potential to provide underground water table enhancement, picturesque recreation point, clean and cool breezes, fishing opportunity, business centre etc. etc. But today, these ponds are creating pollution in the form of foul smell, insects, garbage dumping yard, dirt and actually spreads very bad message about City's Sanitation Vision.

The Problem: The root-cause of various problems from the pond like foul smell, thriving mosquitos in the vicinity of pond is found to be Thriving Algae which actually creates anaerobic condition in pond water eliminating aquatic flora & fauna.

The main pond enemy is Algae, thrives in stagnant water drawing nutrients from added dirt/drain, ample sunlight, genes of Algae which allowing its growth day & night growth of Algae.

Unfeasible Solutions: Conventionally thought solutions to convert Dirty pond to clean pond are not feasible due to very nature of Pond and many uncontrollable parameters. Such impractical solutions are treating pond water as Effluent Water-adding chemicals for treatment, Using microbes, Installing Water Aeration System, bringing strict laws to stop throwing dirt/drain water in pond etc. etc.

Innovative Solution: The innovative solution based on Out of Box approach is available and this solution has virtually Zero initial cost, nil operating cost, Sustainable and Eco-friendly rather Eco-promoting.

The Innovative Solution is developed using the concepts from

(a) Hydroponics to find the solution for Algae challenge

(b) Using Nutrient Extracting Wonder Plant "Vetiver" to starve pond Algae and

(c) Installing Floating Platform made from waste Water Bottles to keep floating Vetiver Plant in the pond

4.

Low Income Communities and Crowd Design: An Approach for Problem Scouting

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The present paper presents a protocol for problem scouting, aiming the identification of relevant community issues to be tackled within a crowd-design process. The proposal derives from an ongoing case study within the Sustainable Maker Project, an initiative that consists of a consortium of organizations and Universities that aims at the creation of an online platform (http://www.innonatives.com) based on the principles of open innovation, connecting people to develop sustainability-related solutions. The proposed protocol for problem scouting involves the use of direct observation; open ended interview, video recording, storytelling, "photo ethnography" or "paparazzi". The paper reports in detail this process for problem scouting during a field study on a low-income community on the Metropolitan Region of Curitiba, Brazil.

Keywords: Problem scouting, crowd-design, design for sustainability

5.

Design, Development and Implementation of First Flush System

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Rainwater is collected from rooftop for drinking purpose in rural area. Water collected form roof top contains many impurities and contaminants like rotten leaves, debris, dust, fecal droppings of birds and animals etc. This water is not suitable for consumption and requires proper treatment. Number of first flushes is designed but they have certain limitations and not maintenance free. The first flush system is designed with low Cost and low maintenance, with high contamination removal efficiency and which is practical enough to be implemented in rural areas. The system is implemented in number of villages and performance is measured with other available first flushes. The proposed flush not only performs well but cheaper, maintenance free and practical more friendly to handle.

6.

ECO-FRIENDLY TOILETS FOR SUSTAINABLE WORLD

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A new innovative and eco-friendly natural stone toilet units is developed in this study. This paper presents the construction details of the proposed stone panel system. Toilets , becoming basic necessity in both rural and urban areas, it is important to deliver the same with a focus on affordability, easy constructability and sustainable. Presently available toilet cubicles , mostly rely on energy intensive materials and expensive. Moreover, such technologies deprive local artisan's job opportunities and do not support local materials.
The proposed system is based on holistic approach and improvises the currently practiced local technology in some parts of India. This engineered approach enables erection of toilet units by skilled as well as semi skilled artisans.
Important feature of this system is self finished and do not demand add on finishes such as tiling/ cement finish/ epoxy. Engineering improvements aim at resistance against natural forces such as wind etc. Foundation systems are suitable to majority of hostile ground conditions.
Integrated base with water sump is proposed to avoid need for water lifting to over head tank. The concept of pedal pump from sump into toilet units uses human energy for water lifting. Roof of the cubicle, which is also made of stone slabs, can directly take solar panels for lighting the toilets. Presently, proposal is limited to cubicle and can be connected to treatment plants.

7.

Design education: empirical investigations of design theory in practice in specific context

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The present extent and content of designers' work has changed from those in the past. Green and Bonollo mention seven phases in the product development process. The global market becoming increasingly competitive; it has become necessary to integrate design into the concept-to-market process and encouraged designers to participate in decision-making for product planning and positioning. While one considers the underdeveloped or developing countries, above considerations need to be modified in the local context and cultural perspective. A new product begins as an idea or a concept and product developers are interested in lean product development to get products faster and at a lower cost to market. The constant change in markets and technology require companies to meet new challenges. Developing new products and improving existing products forms an important step in meeting this challenge. However, this set of knowledge base may not be able to satisfy contextual situation and design students from underdeveloped and developing countries have to understand the stark context of the use of their product. In these places, even people without formal education solve variety of problems through innovation. A designer can learn a lot from this and needs to contribute by integrating design to make these innovations a marketable product. Understanding of various needs of the user and market forces constitute integral knowledge for the design students for initiating new product development based on innovation. The paper discusses research work to evolve a method to assist in bringing these innovations to global customers through design.

Keywords: Design Education, Design Practice, Grass root innovation