

Critical Jugaad: A (Post) Critical Investigation into Marginal Making Practices from Beyond the Anglo-European Sphere

by Deepa Butoliya, Stamps School of Art and Design at University of Michigan

Abstract

The practice of making as a viable, sustainable and social means of production is paramount in the subsistence and survival of maker ecologies, especially those of the global south. The nascent maker ecologies of the western societies are predominantly rooted in the desire to create an exclusionary identity from that of the mainstream neo-liberal economy and aim to create a cultural capital rooted in the need for self-actualization along with the desire to mobilise a progressive future. However, the aspect of western notion of making, although coming from a good position, does not fully capture the intentions and imperatives behind the maker ecologies from the Global South in its entirety. The author posits that making practices of the Global South are not only manifested in their craft industry, but also in the everyday practice of make-do in face of adversity commonly referred by the term Jugaad – a Hindi word expressing the act of making-do and getting by in conditions of scarcity of resources.

If Making futures concerns itself with the exploring the problematique through the optic of contemporary craft and neo-artisanal maker movements from a western perspective only, it risks being myopic by ignoring the pervasive informal making practices around the world characterised by the notion of Jugaad. The author intends to investigate a post-normal turn in generating an understanding the concept of ‘maker’ from a non-western perspective and highlight the critical value of ‘making practices’ of the global south marked by resilient culture and a strong desire to survive and resist; and additionally, explore the implications of such practices in our collective futures.

Exploring the idea of Jugaad as a spectrum of critical making practices, the author brings forth several examples from the Global South such as the local metal workshops of Kenya and the practice of making artifacts out of discarded excess materials, known as Jua-Kali, is one such example. These workshops informally operate as small-scale maker ecologies and provide the communities with artifacts that support everyday life, only that these spaces are not called makerspaces and fablabs. The practice of Jua-Kali and it's speculated futuristic expression in Afrofuturism, is manifested through the work of artist Cyrus Kabiru, who redefines the relationship between fashion and making with a postcolonial critique. The author also brings to attention the examples of maker communities formed around such practices as global networks of resistance to oppression, through the examples of homemade artifacts such as gas masks from plastic bottles made by protestors all over the world.

The author intends to bring forth alternative, often non-linear, positions of making, from a de-colonial perspective, that emerge at the intersections of survival and expression. These practices are a reflection of the true human condition that constantly negotiates its values in the ever-changing landscape of modernity.

Introduction

Making as understood in the western contexts, typically renders an image of a makerspace equipped with 3D printers, computer numerical control (CNC) fabrication machines and a well-stocked inventory of things such as arduino boards, parts and tools needed for a manufacturing activities. A quintessential portrayal of western makerspace is even more stereotypically western that shows making as a masculine hobby with male dominated spaces. This understanding of maker cultures, albeit with a few exceptions, is so rampant and dominant that the places outside the western hemisphere are aspiring to build makerspaces in their communities based on the western models of makerspaces regardless of their own local culture and economy. Such maker ecologies are nascent and predominantly rooted in the desire to create an exclusionary identity from that of the mainstream neoliberal economy and aim to create a cultural capital rooted in the need for self-actualisation along with the desire to mobilise a progressive future.

However, such understanding of making especially in relation to futures is limited in its scope and reach, as it fails to capture disparities of human condition and what making means from the perspective of communities beyond the Anglo-European sphere. The aspect of western notion of making, although coming from a good position, does not fully capture the intentions and imperatives behind the maker ecologies from these non-western communities, also known as the global south, in its entirety. This leads to marginalisation of a wide variety of perspectives of making. There is an urgent need to investigate a post-critical stance in generating an understanding of the concept of maker from a non-western perspective and highlight the critical value of making practices of the global south marked by a resilient culture and a strong desire to survive and resist; and additionally, explore the implications of such practices in our collective futures.

In this paper, I intend to bring forth these perspectives especially those that represent a radical approach towards making as a pre-existing practice in non-western cultures.

Moreover, I intend to introduce positions of craft and making initiatives emerging in the movements and stresses between the traditional cultures and modernity, between rural and urban cultures, between local, regional, national and global levels of interaction and translation. These perspectives are presented by examples of making at the intersection of survival, expressiveness, identity and activism. I explore these marginal making practices as a post-critical investigation that I have termed Critical Jugaad (Butoliya, 2016). These examples of making practices also inform the futurities based on non-linear and non-western notions of identities rooted in making. In my research, I intend to make such practices of making visible and also question the deep-rooted privilege in making and making futures.

The context of this inquiry is the marginal designerly making practices of the Global South. We can understand global south as a geopolitical location that falls outside the centre described by the hegemonic power structures and populations of the Global South, and the populations of the Global South at the margins of societies. As design objects and artifacts resulting from the Global North or West's design practices are introduced in the global south, over time they are modified and appropriated to suit local, socio-cultural needs that create new forms of socio-material and socio-technical practices, which I call marginal making practices. These designerly practices of jugaad mostly occur outside the design studio and often by non-designers in the sense of western understanding of what it means to be a designer.

Making in the Global South

Before we discuss making, it is important to define the term Global South, a contested term that has different meanings in different contexts. In Oxford bibliographies, Anne Garland Mahler describes that the term 'refers to economically disadvantaged nation-states' and 'as a post-Cold War alternative to Third World'. Although the term points towards the southern hemisphere geographically, it is not limited to those geographies rather it refers to as a transnational resistance to globalisation (Prasad and Prasad 2012). The object of study of making in the Global South is understanding how the marginalised survive the aftermath of globalisation. The practice of making as a viable, sustainable and social means of production is paramount in the subsistence and survival of maker ecologies, especially those of the Global South.

With the growth in the past decade in the electronics and telecommunication technologies and access to such technologies and infrastructure, it is a common practice in the Global South to channel a vast majority of informal making sector in the direction of repair, maintenance and local ingenuity enabled innovation.



Figure1. Streetside repair space in Nagpur, India

This maker culture takes place despite the lack of resources and driven by the social and cultural needs to use technologies like the mobile phone devices. These spaces are makerspaces and the street side labs, often self-described as repair shops (in China and India, for example), which are the fablabs in their own right only not recognised as fablabs (Murray and Hand 2014; Csikszentmihalyi, 2012). Making in Global South is not only characterised in its craft but also and more so driven by an imperative to make-do while facing severe constraints and shortage of resources. In these situations, making is not just defined by a material need rather it is defined by willingness to survive against all odds and take pride in their existence. This practice and mindset are often referred as Jugaad.

Jugaad

Jugaad is a popular Hindi word and is widely understood as a make-do practice that symbolises an attitude of a quick fix to solve problems at hand, when faced with resource constraints (Rangaswamy and Densmore, 2013; Kaur, 2016). Jugaad as a concept has been omnipresent in India and some neighbouring South East Asian countries as a socio-cultural phenomenon that has multiple meanings depending upon the context of its use. Jugaad often represents a pragmatic workaround and a subaltern social practice (Rai, 2015) since it is not exclusively tied to materiality and as a means of provision (Jauregui, 2014). Due to the popularity of the term used for vehicles built in northern India, jugaad has been referred to as the practice of jury rigging (Birtchnell, 2011). Many instances of jugaad refer to illegal practices, bureaucratic workarounds and illegal activities of corruption (Rangaswamy, 2011; Rai, 2015; Jauregui, 2014). Fuelled by local ingenuity and driven by need, jugaad is also defined as a creative improvisation (Krishnan, 2010). Jugaad implies reuse, recycle, repair, recontextualisation and repurposing with an imperative for survival. Doing jugaad is fixing a problem quickly with whatever is at hand or with limited resources to navigate the complex situation one might be facing. There are some historical examples of concepts similar to jugaad; for example, the Make Do and Mend movement in the UK in 1950s. Jugaad represents local and contextual ingenuity in providing solutions to everyday problems. Although jugaad comes across as a way of fixing immediate needs (Julier, 2010), it goes beyond problem solving. Jugaad represents a way of navigating complexities in life, describes the personal trait of creativity, and delineates a socio-cultural practice.

Synonymous concepts

Although the concept of jugaad is unique in itself, similar ideas are found outside of the Indian context in other cultures as well. Jaideep Prabhu, Navi Radjou and Simone Ahuja provide various terms related or similar to jugaad in their book *Jugaad Innovation* (2012). Some of the terms to note are Dubragiem from Guinea Bissau, which means ingeniously finding solutions to problems of resource scarcity; Shanzai, which represents a whole means of manufacturing and a semi-legal pattern for scaling a manufacturing-based enterprise in China today; Gambiarra or Jeitinho in Brazil, which means making-do; Jua Kali in Kenya which represents small-scale workshops producing everyday necessities; Zhizhu changxin in China, which means indigenous innovation; Rasquachismo in Chicano culture, which represents local aesthetics as a form of identity; and finally DIY (Do-It-Yourself) in the United States, which refers to a whole plethora of making practices. South African designer and educator, Angus Donald Campbell provides South Africa terms like in IsiZulu, Izenzele; in Sesotho, Iketsetse; and in Setswana, Itirele; which he states “refer to doing it yourself and being self-sufficient” (Campbell, 2015).

Epistemologically, bricolage, a French term for DIY or Do-It-Yourself, is very similar to jugaad. This term was introduced by Claude Lévi-Strauss who associated bricolage with the verb form, a bricoleur, which Lévi-Strauss describes as “someone who works with his hands and uses devious means compared to those of a craftsman.” (Lévi-Strauss, 1962: 11). Another term often associated with jugaad is Systeme D, which includes practices in the informal economy in French-speaking Africa and the Caribbean. Systeme D is understood as the economy of improvisation of the street entrepreneurs.

Jugaad as a concept exists in many terms, forms, and on many scales as reflected in several informal economic practices and entrepreneurships. Instances of jugaad can be found in more affluent western contexts, or the Global North, as well where it is more of a choice than a

necessity. However, these examples are not in the scope of this research and have been excluded to focus on the contexts of the global south. While there is much to be studied about the impact of such practices on an economy, I focus on frameworks of *jugaad* that are relevant to this research, which I have discussed below.



Figure 2. Homemade helmet from paint bucket in Nagpur, Maharashtra, India. Image Source: Unknown (Received through a WhatsApp message (2017))

One way to understand this in Indian context is through the homemade makeshift helmet shown in figure 2. This product can be read as a clever way to bypass the screenings for helmet use by the traffic police or as a solution to combat the extreme heat. It can also be interpreted as a question to the system of objects, as in: What is a helmet? Who decides the standards in these semi-regulated environments? This example also illustrates an important aspect of the visual culture of such practices in the Global South and among transnational citizens, and illustrates what such practices mean in the psyche of the public. Moreover, such examples of *jugaad* serve as an important collection of second-hand research done by collecting examples through social media and similar forms that Appadurai calls *mediascapes*—the dimension of the global flow of culture where media related to *jugaad* such as images, films and videos are exchanged (Appadurai, 1996).

Jugaadscapes

Jugaad can be seen as a product of globalisation. As a result of a neoliberal market ideology, the need for an urban standardized lifestyle is created. This leads to globalisation and results in global cultural flows (Appadura, 1996). *Jugaad*, under these situations, is a practice that is omnipresent as a means to negotiate the forces of globalisation. The anthropologist Arjun Appadurai discusses the effects of such global cultural flows in globalisation through his framework as explained through five dimensions, or what he calls “scapes”—namely *ethnoscapes*, *mediascapes*, *technoscapes*, *financescapes* and *ideoscapes* (Appadurai, 1996). Appadurai expands the understanding about the exchanges that happen through the global

cultural flows of these five scapes. UbiComp researchers Rangaswamy and Sambasivan, after studying the contextual practices around technology modification in the Global South, propose jugaad as a practice of techno-scapes in the context of technology use in low-income communities (Rangaswamy and Sambasivan, 2011). Building upon this argument, I propose that jugaad is a widespread polysemic practice across the Global South (and even in some cases the Global North) and that a new scape, jugaadscape, represents a new dimension to understand, in Appadurai's term, global cultural flows (Appadurai 1996).

Jugaad is not a novel entry in the world of design. Similar epistemic design practices exist and are laid across a wide spectrum of application and styles, but they are not identified as mainstream design in most cases. As I started researching the creative tensions between design and jugaad, a whole plethora or terminologies, similar in meaning and practice, yet disguised as different concepts, started emerging. In the process, I formulated a coalition of terms and artifacts that required a deep dive with the imperative of some sense-making of this information. Jugaad is manifested in different forms as a process or end result, and represents a mindset and a will to survive. However, for the purpose of this research, I am going to use the definition of jugaad as a frugal, bottom-up, everyday making practice done with an intention of a workaround when faced with scarcity of resources. I have mapped the practices in the jugaadscape.

The representation below illustrates the hierarchies in which jugaad is deployed or manifested in the Global South. This fosters an understanding of several practices at various scales and hierarchies. These examples are situated across a broad spectrum, from the everyday domestic workarounds such as placing a stone to stop a door from closing, up through organised systems afforded by modern information technology, including supporting telecommunications and smart devices. The basic characteristics of ingenuity and improvisation as jugaad have been adapted and scaled up to industry, and some principles have been adapted in government projects, an example of which is the Indian Space Research Organisation's aspiring plan to launch an indigenously made space shuttle based on the idea of reusing the technology in space (2014). These jugaadscales represent many modalities of jugaad as explained in the schema in figure 3. These can be understood as:

Jugaad as make-do solutions

An example of jugaad as a make-do solution is a shower head made by puncturing holes in a discarded plastic water bottle (figure 3). This represents everyday ingenuity, a quick fix with what is at hand. The make-do aspect of the practice remains the most understood explanation of jugaad. It is practiced regardless of age, gender, class, or caste and it represents a local contextual socio-material practice.

Jugaad as humor and playful hack

As seen in the example of using trousers to channel cold air from one evaporative cooler to two rooms (figure 3), jugaad often brings forth a playful quality and creates a defamiliarisation (Shklovsky, 1917) effect. Many times the implicit humour of jugaad is also the source of its political critique of the infrastructural deficits, as this humour brings to attention the lack of resources and infrastructure in the Global South.

Jugaad in ecologies of repair

All over India and the Global South there are small scale street side enterprises or startups born out of necessity that contribute to the informal economy of nation-states by providing services in repair and making the local infrastructure robust. These entrepreneurs are often self-taught, semi-skilled technicians that make do with local skills and knowledge to repair objects of everyday use, such as a pressure cooker or a flat tire of a bicycle. These ecologies generate employment opportunities for the unemployed and diversely literate, and help to create a local network of community service providers that makes reuse and recycling possible in the societies that do not prescribe to the throw away culture. These practices therefore enable a sustainable practice around the use of commodities.

Jugaad as leverage

Similar to the jugaad done in ecologies of repair, jugaad leverages existing infrastructures and works through a network of connections and personal relations with an aim to navigate mostly bureaucratic systems. These skills are often found in the grey areas of illegal practices and corruption from the perspective of the elite, but it represents a survival strategy for the marginalised and powerless. An example could be bribing a traffic police constable to avoid getting a fine for traffic violations.

Jugaad in appropriation of services and copyrights

This category builds upon the previous ones and takes the skills and practices further by example, Mgaadi is a service in local startup in Bangalore that uses auto rickshaws for ridesharing, which is based on the model of international companies like Uber and Lyft. This can also be found in the appropriation of visual design materials.

Jugaad as innovation

With the proliferation of the idea of jugaad as a new-age management mantra (Radjou, Prabhu and Ahuja, 2012), many companies in India and abroad are tapping into the potential of local ingenuity and skills to produce commodities with less capital investment. The success of the Mars Orbiter Mission (2014) by the Indian Space Research Organisation is, in some references, attributed to Indian jugaad because the project was achieved for a fourth of the cost of similar western Mars missions.



Figure 3 Jugaadscapes Schema. (Image sources cited with each image)

Filling the gap – what does the interaction of maker culture and jugaad represent? Jugaad as understood through jugaadscapes exemplifies a locally rooted contextual making culture in the flux of technology, global exchange of information, and skills of repair. A deeper reflection on the practice of jugaad reveals that these practice occur at social and political sites of struggle (Rai, 2016) that embody politics of class, caste, gender and religion that are

often expressed and mediated through making and materiality. This research inquiry is about tapping into the potential of such sociomaterial practices and the epistemology of what Rai calls “quasi-capitalist art: jugaad, work-around, or virtuosic precarity” (Rai, 2016) that happens outside the preconceived assumptions of criticality from a dominant Global North’s perspective. My research inquiry uses this notion of jugaad to deepen the context surrounding practices in the Global South. Practices that support informal economies, but face a lack of resources and infrastructures of modernity, are easily available to western societies. I aim to explore how understanding the relationship between jugaad and design creates new meanings for both the terms as well as the hidden aspects of such engagement.

Critical Jugaad

The term jugaad alone cannot represent the complexities that create differences in intention behind various forms of jugaad. Hence, I use the term critical jugaad (Butoliya, 2016) to represent the critical dimension of jugaad, or, using Chantal Mouffe’s term agonism, of the critical attitude of jugaad practices. Critical jugaad is a legitimate way of being, doing and knowing in the world that helps us empathise and visualise a future where such knowledge is valued and deemed important for existence. Additionally, as David Hoy has noted, ‘critique is what makes it possible to distinguish from emancipatory resistance and the resistance co-opted by the oppressive forces’ (Hoy, 2005: 2). This highlights the importance of critique in differentiating between jugaad as a critical make-do practice and jugaad that has been co-opted by mainstream cultures, such as the makerspaces of the Global North. Critique is also important in understanding how these jugaad practices question, problematise, resist, reject and confront marginalisation and seek to establish the existing understanding of jugaad as an authentic mode of existence. For this purpose, I identify and analyse the critical jugaad practices of the Global South. The term post-critical (sometimes used as post-critical) was first used by Michael Polanyi in his seminal work *Tacit Knowledge: Towards a Personal Philosophy* (1950) which meant a shift away from the objective scientific thinking or critical thinking to a thinking that takes into account a personal knowledge which is tacit (Polanyi, 1950). Hence, the exploration of critical jugaad as a marginal making practice is a post-critical investigation in this research.

Why/When is Jugaad Critical?

Jugaad represents a designerly making practice and culture that is critical in its own right, defined by subverting the system and redefining and co-creating new modes of existence. The jugaad-oriented making culture and practice comes from an inherent resilience in Global South cultures and a constant need to adapt and adjust to the changing paradigms of modernity. The joining, welding, fixing to make-do, get-by, and survive are various modes of critical expression. These modes of expression create a new identity and aesthetic code for the makers of the Global South that represent and propose a new understanding for the engagement of design with the political.

Jugaad and similar practices embody a non-institutionalised agenda in a socio materialistic context of the practice and is inclusive and democratic. There is no governing body, labor laws, or technology timeline to this practice. Jugaad is a bottom-up reaction to the top down oppression caused by the capitalist subjugation of market and societies. Jugaad as a state of mind, as a state of existence, and also as an example of alternate lifestyles in Global South cultures offers unlimited potential for visioning a design future.

Jua kali

Jugaad-derived practices are known by various names in diverse cultures and manifested through a multitude of informal practices such as Jua Kali in Kenya. These practices exist in similar material manifestations and within the cultures where making is not used for solving. Critical jugaad in this form represents, on one hand, recuperative appropriations that go beyond making-do and generate employment and local resilience, and on the other hand, subversive appropriation by creating informal systems that do not need official power structures to operate.



Figure 4. Image of a Jua Kali enterprise and worker. Image Copyright Wikimedia user Melifla (2017)

Jua Kali is a Swahili term that means “under the sun” and is used as a general description for all the jugaad-type making practices found in Kenya (King, 1996). Here making is not used in the sense of a maker culture, but as bottom-up, small-scale workshops where items of everyday use are made, usually by hand and without using industrial tools. This term could be used for the products themselves, such ovens and ladles, or it could be used for the workshops where those products are made, as shown in figure 4 above. Jua Kali in this sense resembles the making and the entrepreneurial spirit that exists outside the mainstream dominant capitalist markets and represents the local ingenuity and contribution to informal economy. This everyday making practice is not just about problem solving, but also creates community-based economies of resistance and a production culture based on sharing of local knowledge and resources.

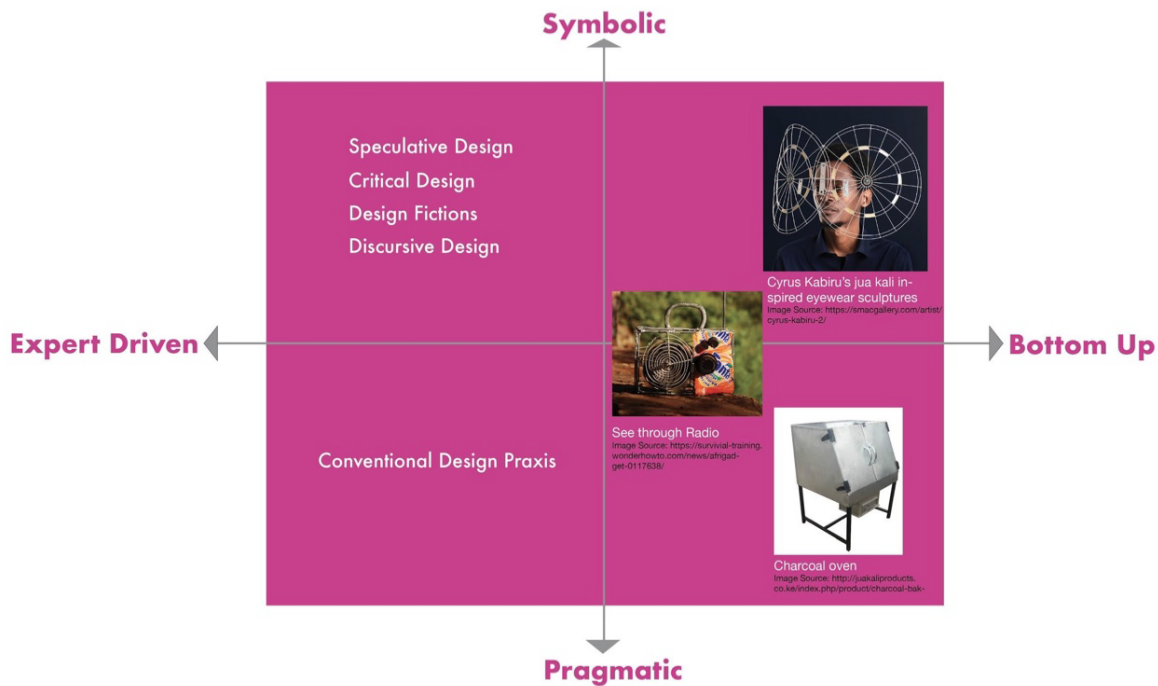


Figure 5. Analytical Framework with Jua Kali Artifacts. Image sources cited in the figure jugaad artifacts.

Making practices and cultures like Jua Kali have several modes of expressions and hierarchies inherent in such categories. There are artists in Kenya that use Jua Kali as a mode of expression, and there are entrepreneurs who have scaled up this practice to be accounted for as successful enterprises of informal economy. This framework is helpful in differentiating artifacts of critical jugaad and establishing relationship amongst them, and in analysing the modes within such practice categories since they do not represent the value of the beliefs inherent in As illustrated in figure 5, there are three examples of Jua Kali. The tin oven in the bottom-right quadrant is a more pragmatic and bottom-up artifact that represents the spirit of jugaad and a designerly marginal practice of making and making-do. The second example is a radio made out of discarded Fanta cans and the association is less pragmatic but more symbolic and helps bring forth a self-expressive paradigm in this context. The fashion glasses by artist Cyrus Kabiru in the upper right-hand quadrant represents a more symbolic aspect of such making. Kabiru is a self-taught artist of Kenyan origin who makes eyewear sculptures out of found objects. Making/Hacking + Decoloniality + Expressiveness/Pleasure

As seen through Kabiru's work, making in the Global South not only manifests as a way to support the economy, but also as a way to express identities apart from the mainstream hegemonic narratives of futures that stem from the practices like Jua Kali as an important part of local culture and economy. Inspired from the Jua Kali practices, artist Tahir Carl Karmali creates mixed media photograph portraits of Jua Kali workers as seen in figure 6, which Karmali describes "as if one adorned themselves with found objects, which somehow work together to make them superhuman. The Jua Kali sector is built from the opportunistic personality and perseverance of the Jua Kali worker who often use locally available recycled or found objects to develop their creations (2014).



Figure 6. Portrait from the series for *Jua Kali* by Tahir Carl Kamari (2014)
Retrieved from <http://tahirk.com/jua-kali/>

These portraits disrupt the understanding and mental models of what an image of futures based on making might look like in the sense similar to that of design fictions, which are mostly based on western privileged technocentric narratives.

Making/Hacking + Survival + Activism/Protest

The most successful form of critical *jugaad* is when it is engaged in the field for purposes of political resistance and resilience. What is critical and what is *jugaad* comes to light as we analyse the example of gas masks made from discarded plastic bottles and other household objects. The trope of critical *jugaad* as a concept that furthers the conversation about design's engagement with politics, such as with the homemade gas mask. The homemade gas mask as seen in its many versions throughout the landscape of protests, especially those of the Global South, creates a material interface for a postnormal design framework with humanitarian crises. Such gas masks are used in around the world in protests against oppressive governments and their forces. These versions of critical *jugaad* are not only political but also participatory, as when the marginalised populations and their supporters produce and share knowledge to enable others to participate in activities of political dissent.



Figure 7. Venezuelan homemade gas masks.

Retrieved from: <http://www.businessinsider.com/venezuela-gas-masks-2014-2>)

These homemade gas masks, as seen in figure 7, are made from found objects and have become global symbols of protest and resistance. These masks are provocative on two fronts. First, they actively incite the oppressing forces while offering a critique towards the regimes. Second, they engage passive audiences by presenting a visual critique of dysfunctional systems and governments, thus bringing to attention the struggles of the marginalised who are fighting for their convictions and rights. The images of people wearing such masks are as surreal as the dystopian fictions yet grounded in reality. The critique is offered by deploying these masks in protest as critical objects in action, and also by placing these masks as passive art objects that questions the disparities of human condition along race, class, gender and power.

Making/Hacking + Survival + Resilience



Figure 8. Floating devices made for disaster preparedness during flooding by Thai NGO Designs for Disasters. Retrieved from: <http://www.designfordisasters.org/TH/ourProjects-detail.php?id=15>

This category represents the aspect of critical jugaad as making for fostering resilience in communities. Figure 8 shows making and testing of a homemade flotation device designed by a Thai NGO Design for Disasters that helps and educates communities in Thailand to be prepared in case of flooding and rebuild these communities without relying on outside aide. These floatation devices are made from readily available materials and community members are taught to make their own based on similar principles. This making practice is not only practiced as a mode of survival but also as a way of expressing the creativity and positive attitudes within such communities even in times of crises. These making practices are embodied as intentions at local and grassroots level for making sustainable and just futures for everyone which also reflect the power of such practices to build resilience and also refusing to be just dependent on external and foreign aid.

Conclusion

Critical jugaad fills this gap in terms of making, making-do and survival and represents a criticality from the Global South that moves beyond the western understanding of criticality in relation to futures and making futures. All jugaad is appropriation, and critical jugaad politicises that appropriation. Critical jugaad lets users to participate in design for areas that are crucial for survival and creating their own futures. The epistemology of critical jugaad offers a non-western view that engages with making and design. The critical jugaad also argues that the knowledge offered by the epistemologies of critical designerly making practices of the Global South offers insights into the future designerly practices that Speculative and Critical Design (SCD) fails to capture. In identifying the infinite diversity of the world as one of its basic premises, the critical jugaad framework clearly takes on an ontological dimension. However, it is important to note that each instance of critical jugaad is specific to its time and place. Also, an important distinction between jugaad and practices that come from a more affluent context is that the western jugaad examples do not re-embodiment the same political charge, and hence are not fully considered in the context of this inquiry.

Through jugaad, design becomes accessible to everyone who participates in ingenuity. Here bottom-up making moves to the area otherwise reserved by the rigid borders of design and western understanding of making or

makerspaces. Critical jugaad is a bridge that connects and empowers people with no design expertise to participate in, critique, and eventually try to transition towards their own version of the future. Criticality embodied in critical jugaad transcends the differentiation between race and gender as it is derived from everyday struggles and necessities for survival in a way they are not reflected in western making and futures. Replacing one criticality with another is inherently contradictory, but it's a useful contradiction because it moves beyond a colonialist approach and uncovers unconscious bias as understood in the western debates on critique. This research inquiry established critical jugaad as a practice that is subversive and recuperative. Critical jugaad provides perspectives within jugaad to claim a higher order purpose of jugaad for resistance, make marginalised knowledge visible, and realise its transformative potential. Critical jugaad is a legitimate way of being, doing and knowing in the world that helps us empathise and visualise a future where such knowledge is valued and deemed important for existence. This research suggests that critical jugaad as a postnormal design practice can help us transition to sustainable, democratic, and inclusive futures through a socially engaged design practice. The act of improvisation while facing scarcity is a marginal designerly practice in the Global South, and the aspect of improvisation in times of high uncertainties and scarcity is a decolonial and frugal designerly practice needed for our collective future. The understanding of making and making futures in the western context is rooted in the privilege that is embedded in such practices and in order to fully understand how making could affect futures, one must question their privilege and engage with practices that are beyond the Anglo-European sphere. If Making futures concerns itself with the exploring the problematique through the optic of contemporary craft and neo-artisanal maker movements from a western perspective only, it risks being myopic by ignoring the pervasive informal making practices around the world characterised by jugaad.

Endnotes

For more on Tahir Carl Kalmari see <http://tahirk.com/jua-kali/>

For more on work of Cyrus Kabiru se <https://smacgallery.com/artist/cyrus-kabiru-2/>

For more on the NGO Design for Disasters see <http://designfordisasters.org/TH/>

<http://www.oxfordbibliographies.com/view/document/obo-9780190221911/obo-9780190221911-0055.xml>

References:

Appadurai, A. (1990) Disjuncture and difference in the global cultural economy. *Theory, culture & society*, 7(2-3), pp.295-310.

Birtchnell, T. (2011) Jugaad as systemic risk and disruptive innovation in India. *Contemporary South Asia*, 19(4), pp.357-372.

Butoliya, D. (2016) Critical Jugaad. In *Ethnographic Praxis in Industry Conference Proceedings* (Vol. 2016, No. 1, pp. 544-544).

Campbell, A.D. (2017) Lay Designers: Grassroots Innovation for Appropriate Change. *Design Issues*, 33(1), pp.30-47.

Csikszentmihalyi, C. (2012) Sixteen reflective bits. *Critical Making: Manifestos* ([http://conceptlab.com/critical-making/PDFs/Critical Making 2012 Hertz-Manifestos-pp23to32-Csikszentmihalyi-Sixteen Reflective Bits. pdf](http://conceptlab.com/critical-making/PDFs/Critical%20Making%202012%20Hertz-Manifestos-pp23to32-Csikszentmihalyi-Sixteen%20Reflective%20Bits.pdf)).

Hoy, D.C. (2005) *Critical resistance: From poststructuralism to post-critique*. MIT Press.

Jauregui, B. (2014) Provisional agency in India: Jugaad and legitimation of corruption. *American Ethnologist*, 41(1), pp.76-91.

Julier, G. (2013) *The culture of design*. Sage.

Kaur, R. (2016) The innovative Indian: Common man and the politics of jugaad culture. *Contemporary South Asia*, 24(3), pp.313-327.

- King, K. (1996) *Jua Kali Kenya: change & development in an informal economy, 1970-95*. Ohio State University Press.
- Krishnan, R.T. (2010) *From jugaad to systematic innovation: The challenge for India*. Bangalore: Utpreeraka Foundation.
- Levi-Strauss, C. (1966) *The savage mind*. University of Chicago Press.
- Murray, P.R. and Hand, C. (2015) Making Culture: Locating the Digital Humanities in India. *Visible Language*, 49(3).
- Prasad, A. and Prasad, S. (2012) Imaginative geography, neoliberal globalization, and colonial distinctions: Docile and dangerous bodies in medical transcription 'outsourcing'. *cultural geographies*, 19(3), pp.349-364.
- Radjou, N., Prabhu, J. and Ahuja, S. (2012) *Jugaad innovation: Think frugal, be flexible, generate breakthrough growth*. John Wiley & Sons.
- Rai, A.S. (2015) The affect of Jugaad: Frugal innovation and postcolonial practice in India's mobile phone ecology. *Environment and Planning D: Society and Space*, 33(6), pp.985-1002.
- Rai, A.S., *A Political Ontology of the Affective Image in India*.
- Rangaswamy, N. and Densmore, M. (2013) Understanding Jugaad: ICTD and the tensions of appropriation, innovation and utility. In *Proceedings of the Sixth International Conference on Information and Communications Technologies and Development: Notes-Volume 2* (pp. 120-123). ACM.
- Rangaswamy, N. and Sambasivan, N. (2011) Cutting Chai, Jugaad, and Here Pheri: towards UbiComp for a global community. *Personal and Ubiquitous Computing*, 15(6), pp.553-564.
- Reid, L.A. and Polanyi, M. (1959) *Personal knowledge: towards a post-critical philosophy*.
- Viktor, S. and Marion, R. (1965) *Art as Technique. Russian Formalism Criticism: Four Essays*.