Design RaSCar

identifying vectors of creativity in restrictive circumstances

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Designrascar

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Designrascar: Identifying Vectors of Creativity in Restrictive Circumstances

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Abstract

Indigenous cultures of street innovation and improvisation worldwide have regarded adversity as inspiration and opportunity for radical change.

This research identifies the common vectors which form critical components of the associated creative process, towards developing an alternative philosophical approach to queries of design. The subsequent model imbibes and endorses the inherent positives within DIY cultures, and seeks to produce design aimed at needs rather than wants, an ethos which the research wishes to promote across levels of design education.

Some of the finest instances of human resourcefulness can be attributed to situations of great duress, either sudden or prevailing, that have acted to heighten basic instincts of self-preservation. Circumstances of hardship may be a prominent contributor to deep-rooted DIY practices in India (under the common theme of *Jugaad*), and other cultures such as China (where it is known as *Zizhu Chuangxin*), Brazil (*Gambiarra*), Kenya (*Jua Kali*), France (*Systèm-D*), Germany (*Trick 17*), and Portugal (*Desenrascar*).

These indigenous cultures of improvisation serve as valid mnemonics of a certain connatural approach to design that is seemingly rampant, and exists in plain sight, but is often overpassed. With an allegedly gradual converging of global sensibilities, such unidealistic pursuits may get regarded as being outside of the design pandect, and thus proletarian and/or inconsequential, however, creativity driven by constraints and rooting from primal instincts may prove to be explicit and vastly liberating, and thus deserves a parallel line of deliberation.

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Prelude

There is a scene in Monty Python's Life of Brian (1979) where the People's Front of Judea is plotting the downfall of the prevailing Roman occupation. After setting ridiculously long deadlines, the members start taking turns to iterate, reiterate, re-stress and re-emphasize on the pressing need to take swift action, when Judith, another member, barges in and announces the capture and imminent crucifixion of Brian, the new (and unwilling) face of the front. Upon hearing her desperate report, the head of the group, Reg, calls for an immediate discussion on passing a resolution to take immediate action. Judith is understandably astonished and tries in vain to urge them to attempt a resolution using simpler means (by going out of the door and trying to stop the Romans from nailing Brian up). "It's happening Reg!", she cries, "something's actually happening! Can't you understand?"

I too have never considered design as anything humdrum. In my world, it has had an element of bombastic enthusiasm to it, unchastened and ever-ready for fresh mischief. As a de facto instrument for emancipation, design has previously acted to liberate my person from many a spot of bother (such as the vortices of conventional academics, and corporate appointments), hence it effectively embodies a spirit of hope and revolution. Despite frequent visits to shores of science, logic and method, since my childhood I have more or less persevered with imagining it within the realms of wondrous artistic exploration, owing perhaps more to general inaptitude in the former than an express strategy. There exists in my mind, a perception of design as a radical operant, a spectrum of unpredictability capable of not only producing genuine tripe, but also the occasional catharsis.

Academic writing pertaining to design on the other hand, in the limited period of time I've spent studying it, has sung a largely different tune. It isn't as if the works that I have read have not been incisive. On the contrary, in the initial stages of my research, I was inspired and intimidated in equal measure and wanted to write with as much scientific vigour and propriety. However, with a bit more research experience

arrived the realisation - and the subsequent critique - that at times the authors I was consulting, tended to envision their creative subjects expansively through the prism of science, veering towards the relative safety of its turgidity and the accompanying archaism, with a view to garner scientific approval, so much so that the ostensible edge of their subject would eventually get blunted by technicalities. As an individual with artistic pursuits, I would wonder if it is more pertinent to put forward creative arguments with a greater degree of rawness, without an artificial need to manufacture conviction, in order to maintain originality. Of course, it may not come across as being instantly agreeable, which is fine, albeit as Mike the Mad Biologist (2013) writes in "Scientific writing is really boring," "When papers become more valued as professional currency than as communication, it's no surprise that the communication suffers: who reads a dollar bill?" Thus it is imperative in my view to imbibe and interpret the idiosyncratic and improvisational nature of my own subject which by default puts more stress on raw originality than on adornment. In this writing, I have thereby endeavoured to cajole only the essential technical aspects, while letting the research gain more from some of its own directives, that view inhibitions as opportunities lost.

The style of narrative has been an additional area of contemplation. I have predominantly considered two paths - monologic and dialogic. Where as monologue is naturally the established norm, and has been so for a considerable period of time, to contemplate a dialogic or dialectic route however, presents its own set of pleasantly perplexing challenges, and is invariably the more compelling alternative since the concept of dialogue is so central to the theme of my research. Writing is a tool of thought, and thought is internalised dialogue (Vygotskiĭ, 1962). Through having a written meta-cognitive dialogue thus, I get to elaborate upon my own thinking. This is particularly useful while retrospectively examining certain situations which are fundamentally unpredictable in nature, such as the outcomes of the Designrascar exercises. It works to incrementally augment the understanding, not unlike what bricoleurs achieve from having iterative dialogues with their respective scenarios. The dialectic process also calls for a greater injection of individuality on my behalf as the creativity researcher/researching creative, since I effectively present a lineation of original thought while constructing the alternative philosophy. This is not to say that the entire work is exclusively a compilation of personal ramblings. The dialogue extends beyond my own interaction with the research subject, and incorporates literature reviews, and insights and feedback from key individuals and researchers including my supervisors, course director, colleagues, scientific network, the experts contacted from parallel fields of research, participants from various Designrascar exercises, and the general populace, all of whom I have approached with meddlesome queries, or cameras, or both.

Integrating phenomenography as a methodological tool, albeit in substrata rather than directly in practice, appends two other dialectic dimensions to the discourse. Firstly, it allows for the use of my own experiences as input data for phenomenographic analysis. Secondly, and more vitally, I get to study the unique interactions of the concept with a select set of actors introduced during different stages of the research, through which I build my argument. Although I discuss the same in greater depth in the corresponding chapters, I would like to add here that a phenomenographic study in the context of improvisational creativity categorically corresponds to both subjectivist assumptions (one goal, many means), and the procedural markers (iteration, reorganization, reinterpretation) which I endorse during the course of this thesis. Relatedly, over the course of this research, I have given an equal level of importance to non-academic voices, in addition to academic ones, since the nature of the subject comprises of creative production that stems from real life situations, and its *in situ* actors are common folk who exhibit

ingrained human ingenuity in most cases, rather than a processed knowledge of design. Their voice, and the voice of the society at large that reflects upon their actions is thus an equally (if not more) valuable counsel for comprehending the various elements of improvisation, especially in restrictive circumstances. In this way, a traditional notion of a literature review gives way instead to a discourse review which proves phenomenographically more adept.

Introduction

A necessidade aguça o engenho

Introduction

To do ‘more with less’ is a long-standing debate in contemporary design. From Buckminster Fuller (1938, p.252) to Bruce Mau, many theorists have tried to objectify the debate into a practical design problem and sought to utilize their design experience in finding real life solutions that explore different ways to do more with less. During his “Massive Change: The Future of Global Design” exhibit held at the Museum of Contemporary Art in Chicago (2006), Bruce Mau hosted several industry leading designers, artists, scientists and theorists to express their vision of the future, with ‘doing more with less’ being the underlying template. For Mau, the revolution or “massive change” has many prerequisites, most noticeably, newness - in devising inclusive and flexible “critical faculties”, in the utilization of products and processes, and in thought, to be able to instigate and abut such a revolution. It also requires a stage like the Museum of Contemporary Art in Chicago, complete with a cherry-picked set of intellectuals, to enable a substantive debate. The findings of the committee and conviction of Mau towards his notion of Massive Change have since culminated in the Network of Massive Change which works with “global brands, institutions, and individuals” to “set long term goals” and “achieve real world impacts”.

In 2010, Forbes India listed Manshuklal Prajapati as one of seven most powerful ‘rural’ Indian entrepreneurs whose inventions “are changing lives” across the country. Born in a family of potters, high school dropout Manshuk did odd jobs before landing a supervisory position in a roof tile manufacturing company near Rajkot, Gujarat. In 1989, as was his wont, he started his own pottery, producing various kitchen utensils made of clay. In 2002 Manshuk launched the Mitticool refrigerator, a product that would go on to make him a recipient of several state and national rural development awards. His website states plainly that the aim is “to provide all luxurious things” to rural folk who cannot afford electronic appliances. He credits his success to parental blessings and family support.

Grass-root interventions such as Manshuk’s are a valid example of an evolutionary design approach that has existed over the centuries in various cultures around the world, and exemplifies the spirit of ‘doing more with less.’ Albert Einstein once famously said that ‘one cannot solve a problem with the same mindset that created it in the first place.’ Often a subject for cocooned discourses on better design, the common person has been leading a form of innovation that design revolutionaries either tend to ignore or reject as rudimentary. This parallel creative phenomenon arises in the face of dire human power and/or resource constraints and entails an attitude towards problem-solving that may seem crude from the soutset but may be of direct consequence in our current era of austerity. In Portugal, where this research is based, the term for this phenomenon is Desenrascar.

Cultures of improvised problem-solving

Forms of improvised problem solving have existed across cultures throughout history. Indigenous versions of alternate interventions determined by extant circumstances, are famous in China (where it is known as Zizhu Chuangxin), Portugal (Desenrascar), Brazil (Gambiarra), Kenya (Jua Kali), France (Système-D), Germany (Trick 17) and Japan (Chindōgu). In India, the operative term is Jugaad. Pattanaik (2008) summarises it as,

> *At a deeper cultural core, Indians believe there is nothing rigid about life. Everything is solvable, manageable and there is usually a workaround. An inherent distrust prevails of systems, and thus there is little investment of time or effort in building them. In a typical way of accommodating everything, we surrender to fate for big things in life, but for small things we subscribe to Jugaad.* (Pattanaik, 2008)

Jugaad, to make a specific example, has resided in relative articulations within the bounds of Indian culture since an inexact antiquity, which is evident from the tradition of chanting mantras or wearing gemstones to avert bothersome situations. The name draws its etymology from the act of improvising an indigenous vehicle with related or unrelated materials and is symbolic of circumstances of persistent resource scarcity resulting from centuries of colonization. It typifies a heightened and sustaining survival instinct in the mass psyche to the extent of compulsion, and even propriety. The accompanying mindset of extracting maximum utility from available resources has although contributed inadvertently towards limiting the material footprint of the population of a billion plus. The culture of Jugaad has unabashedly been "good enough" (Ahuja, Prabhu, Radjou, 2012) in this regard.

Thus, in today's context, Jugaad and its cultural cousins from around the world are an extremely pertinent subject of study and inspiration, holding the potential to approach queries of design in a wholly different light. Instead of value addition, it looks to maximize the use of available resources till the best possible solutions in accordance with said factors are reached. Instead of reinventing the wheel and developing everything from scratch, again and again, a Jugaad mindset *leverages* what is already there (Ahuja, Prabhu, Radjou, 2012). At present, western corporations are seen as world leaders in presenting ground-breaking ideas, however, many continue to churn out expensive, overly complicated products weighed down by superfluous attributes. In developing economies like India, things are kept simple by necessity, and it is this simplicity which I wish to argue as a key component of an alternative approach to modern daedalic design - Designrascar.

Research Objectives

Designrascar, the title of this work, is a derivative of Desenrascar, the Portuguese term for improvisation. The infusion of the word Design in Desenrascar is made to suggest an inherent mutual presence and continuity between the two concepts, and it also works as a conception that highlights an important facet of improvisation, which is to make impromptu atypical connections for arriving at a whole that is

greater than the sum of its parts. Effectively, it is an approach to creative problem solving that imbibes the ethos of Jugaad, and other cultures of improvisation, and synthesizes their inherent positives into one highly customisable mode of reformative action. The Designrascar approach can also be considered as a supplementary model of creative engagement, specifically in situations where resource and/or time insufficiency supplicates the exercising of improvisation as reformative action. The word 'exercising' is crucial here, because the research deems improvisation as both a basic human attribute and a specialised skill, and perceives value in keeping it honed for circumstances that entail uncertainty.

In order to understand the overall scope of Designrascar before projecting it as an alternative approach to queries of design, the research has primarily considered two pathways—one theoretical, and the other, practice-based—that have run concurrently, and contributively in terms of knowledge transfer. The main objective of the theoretical component of this research is to comprehend the particularities of the relationship between constraints and innovation, and correspondingly, to identify the common vectors that aid the associated creative process, either in the form of catalysts or as procedural elements. The research conceives the phenomenon of improvisation as too large and too multifaceted to fit into a singular definition, and has thus endeavoured to uncover the underlying common narrative first that includes the distinctive characteristics. For this purpose, the sample set of examples has been run through a Taxonomic tool that has been created specifically for this research to catalogue their individual scope. This analytical tool, the Improvisation Rangefinder, introduces a framework through which any act of improvisation can be codified into either one of the three identified persuasions, or any further, that is yet to be ascertained. The overall scale of the phenomenon does not allow most of the emerging common characteristics—or vectors— to be omnipresent, however, among the cases the research has considered, there are a perceptible patterns of recurrence. These distinctive patterns come into view when each individual case is broken down into a set of determinants, that are then projected upon their respective scales on the rangefinder. The patterns reveal three predominant categories of improvisation based upon their persuasion. These are: Improvisation in times of emergency, where improvised action is taken for the matter of subsistence in dire situations; Everyday improvisation, where the aim is to offset smaller constraints, and whose ubiquity in different cultures around the world prompts the argument of whether it can qualify as a cultural pattern; and Improvisation in Business and Social entrepreneurship, where actions of improvisation are made navigate resource constraints towards channelling corporate innovation and/or addressing social needs. The research needs to note here that although the collected sample size, and subsequently the identification of the different categories, is found sufficient to initiate the discourse, it acknowledges that further examples, irrespective of scale, if compared on the rangefinder, can potentially add to the proposed categories. Upon the identification of the three categories of persuasion, the theoretical research moves to the analysis of each through a spectrum of examples, in order to establish commonalities in procedure and stimulation. The examples additionally illustrate the wide gamut of flavours that improvised action encompasses, and thereby provide an insight into how common the phenomenon actually is and how effortlessly it connects with the masses. This may prove to be edifying for design, and design research on the whole, whose traditional outlook towards ad-hoc solutions has not been favourable.

The chapters conclude with consolidating the identifiable common aspects, which are then evaluated on an individual basis in the corresponding section, Elements of Improvisation. This section is bipartite, the first of which covers the common procedural elements that are determined in the form of sub-

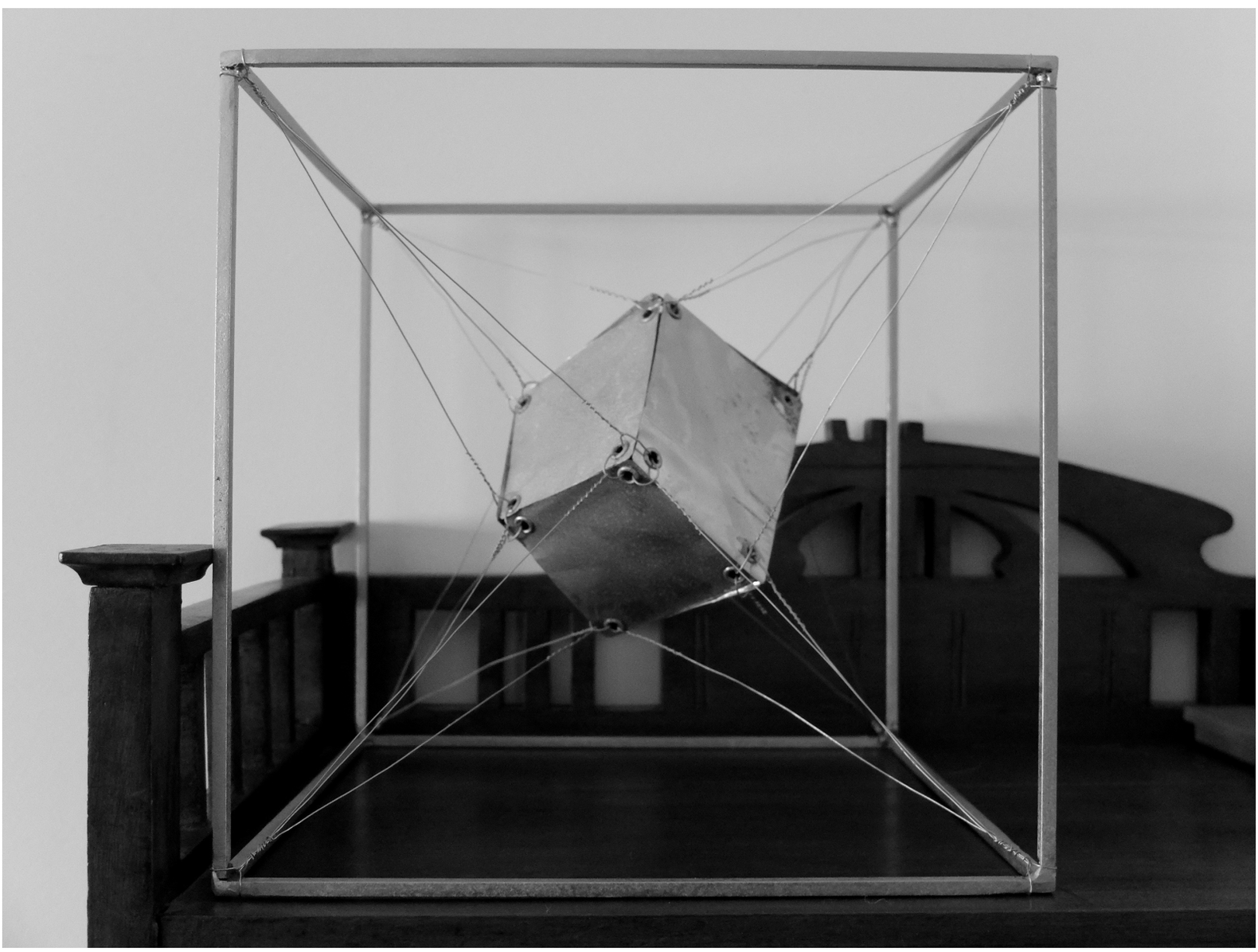
level ‘acts’ within the larger creative process. The thesis discusses the bearing of each act on the process of improvisation, including their contribution and potentiality. Examples are presented at opportune moments to illustrate their significance as constitutional elements. The second part of this section acknowledges the dialogic nature of such action, with the self, surroundings, and the resources. Within this occurring dialogue, five additional field are identified as vectors fundamental to actualizing improvisation. These include the typical characteristics of tools and resources, and the nature of the resulting solutions themselves. The roles of catalysts such as critical and creative lines of thought, stress, types of applicable knowledge, and intuition are also discussed. The section culminates with a summary of the learnings, and stresses upon the validity of constructing a specific perspective as a design approach. This design approach, Designrascar, is not only meant as a theoretical principle that serves to establish, albeit belatedly, the potency of creative improvisation as reformative action in mainstream design, but it is also a replicable functional model that is already being implemented in real world situations, for negotiating constraints and affecting cultural and socio-economic advancements.

The second pathway to the research carries forward the discussion from theory to actual implementation. From the very beginning, the research has operated on the presumption that creative production tends to turn ‘smarter’ when faced with conditions that are not entirely desirable. There is a further infusion of critical thought, core objectives become clearer, unnecessary components are determined and meticulously shunted, and the actions become more measured. Designrascar has sought to corroborate this with constant experimentation. The initial impetus came from a personal situation of constraint that resulted in amendatory reaction by the way of a non-formal group initiative.

The initiative proposed a workaround to counter the situation of constraint through assaying its various specifics from a critical standpoint. Emancipatory action ultimately emerged from focussing on the core need, and then deliberating on possible alternative ways to fulfil it. Creative production thus lay in this process of deliberation, where the field of debate was open to traditional, non-traditional, and absurd suggestions alike. Thereby, it presented a case for creativity to ascend above conventionality in light of constraints. This proved instructive for the research to contemplate classroom exercises, which could be based on the same kernel, but whose context could be tweaked to favour the objectives of ongoing subject modules for the participating students. Opportunities in this regard came in the way of ancillary workshops with professors of design from the faculties of engineering, and fine arts, at the University of Porto.

The exercises carried the banner of Designrascar, and presented simulated situations of restriction, where the participants were required to make terms with certain constraints through improvised problem-solving while achieving their creative objectives. In the end the participants were required to explain their thought process, from which valuable phenomenographic data was derived for cross-fertilization with the theoretical pathway. For example, a realization regarding the relationship between experience and improvisation emerged from the exercises. The exercises which spanned multiple sessions showed gradual signs of improvement in the quality of the proposals, with each passing term, whereas the same was more hit or miss in the single session events. This prompted the theoretical aspect of the research to investigate further into the correlation between the quality of improvisation and its own praxis. This investigation revealed two critical theoretical components, namely, the role of different types of knowledge in improvised problem solving, and the importance of incremental learning.

Section 1



Chapter 1

Taxonomy of Improvisation

Improvisation as a life skill is utilised by us in a vast array of scenarios, from the mundane to the extreme. One of the key aspects of this research, taking a cue from Morris (2012), has been to understand what the individuals, whom have been interviewed or interacted with in this regard, think of first when asked about the word improvisation, or improv. The reflections have ranged from improvisation in Jazz music and stand-up comedy to the use of hexagonal pencils for rewinding audio cassettes, and the sheer width of the sample size has only added to an increasing inkling that day to day living is very much an act of improvisation itself. Two critical patterns of thought which can be considered interpretive have emerged from these individual insights. The first of these, to explain briefly, is that people understand improvisation as a reactionary, rather than a pre-emptive measure to a given situation, and to come up with the proverbial goods, the prospective improvisers rely on engaging in what is often considered as a 'fluky' dialogue with the immediate or relative environment, and which results in typically uncharacteristic solutions that seem to work 'just fine'. The second consonance that emerges is the notion of a cultural disposition or a cultural pattern which identifies and designates everyday improvisation as a trait proliferating within a certain populace, such as Jugaad in India, or Desenrascar in Portugal. If we consider for a while the example of the hexagonal pencil and the audio cassette, a few scenarios can be speculated from it, which may have accidentally or otherwise lead to determining one product's relationship with the other, since neither were assumedly created with the intention of co-compatibility. The more utilitarian of these scenarios which can be surmised is that when faced with the complication of an unspooled audio cassette, and upon realising the futility of the cassette player in correcting the situation, the original improviser may have taken a long hard look at the accompanying mechanics and deduced a number of different ways in which the thin and flimsy audio tape could be carefully spooled back in. The hexagonal pencil may have just been the solution that fit the best, but it may not have necessarily been the first. The same can hold true for other common examples of life hacks such as cork stoppers and pan lids, tight shoes and hair dryers, and the vast array of applications afforded by corrugated paperboards, among countless others. This inference of prospective, albeit firmly atypical solutions speaks of a process of solution making that is built upon incremental learning, and which when combined with the preceding action of determining the mechanics of the complexity at hand, apprises of a naturally occurring dialogic nature of interaction (Louridas, 1999, p.517-535) within the creative space.

Professional improvisers such as Morris and Matuszak (2012) perceive improvisation as a conversation between the self and the situation, and agree that as a profitable skill, it requires nurturing and constant practice. Matuszak furthers the discourse by suggesting that while improvising, we think and act simultaneously with considerable nimbleness, and in doing so we call upon our embodied knowledge and experience, and effectuate a robust use of our imagination. Additionally, both professional improvisers agree on one specific element of the above-mentioned dialogue as being central to any successful attempt at improvisation, which is the use of "Yes, and.." on the part of the improviser. "Yes, and" in the course of the conversation reflects the improviser's willingness to roll with the situation. It also sets in motion an add-on approach to problem solving that is intrinsically optimistic, and brings congruity of action between otherwise independent human and material actors. Contrary to the direction of "Yes, and", according to Matuszak, stands the expression of "No, but", which indicates a reluctance to engage in any sort of interplay with the situation, in fear of the unpredictability of eventual outcome, or "Yes, but" which while acting to reduce the previous statement, pits separate ideas in direct path of collision, thereby adversely affecting the said congruity. Neither of these latter expressions are completely invalid per say, since different situations have disparate demands, but as Matuszak iterates, an improviser is highly aware of potential risks which are not only posed by the situation itself but also those which may arise as a consequence of not making constructive efforts at deliverance. This may be the factor behind the seemingly idiosyncratic associations which improvisers, bricoleurs and their ilk arrive at by ingeminating "Yes, and" throughout the length of the process. Whereas to the uninitiated, the subsequent results may have the appearance of being overtly unconventional, to the improvisers the same may be an unabridged manifestation of possibilities which they have perceived in uncertain scenarios.

Situations of uncertainty, where improvisation is utilized as reformative action, may abound in varied forms, whereby the corresponding action takes on distinct contextual hues. In order to construct a suitable scheme for identifying different brands of improvisation, thus, it becomes imperative to classify the broader nature of their persuasion. In light of the indefinite amount of appropriate examples, a limited and workable¬—though random— number of examples has been sought by this research, for analysis, and the subsequent construction of a taxonomy based on various contexts in relation to improvisation, along with the identification of common vectors that constitute the associated creative process. With regard to the taxonomy, it has been considered important to determine a starting locus that can then explain the scope of an improvised intervention, irrespective of its scale of implication and/or application. This has eventualised in the form of a set of four determinants which can effectively place an act of improvisation within pre-cogitated structural parameters, and in this way demonstrate its respective scope, vis-à-vis others, if and when compared. The set of determinants emanating from evaluation of the examples are explained as follows:

•**Determinant 1. Scale of Exigency:** Each act of improvisation is governed by a specific need or requirement to which a time frame can be attached. The two extremes of this scale appear as circumstances which are either brought forth either with certain immediacy, or can be considered prevailing, depending upon the specificity of the context. There are cases when the need requires instantaneous action and the surrounding resource situation forces one to improvise with alacrity in order to plug the axiomatic leaks. It may even be as quotidian a situation as employing a pen as an impromptu backscratcher in quelling a sudden itch, or using chalk sticks to soak up spilt ink, or putting spoons in open champagne bottles to preserve bubbles,

all of which are typical instances which we may never reckon as acts of improvisation, or recognise the fact that the rapid, aberrant, but perfectly functional connections and associations we made might have been partially subliminal. The lowest extreme is thus, reserved for improvisation provoked by physical aggravation or assault, such as using keys or rolled-up magazines for self-defence, and is duly followed by reactions to calamitous circumstances such as natural disasters. Further along the scale lie areas significative of either unfavourably rife situations, such as extreme poverty, or drawn out periods of political unrest, which are generally accompanied by an occluded or inadequate state of resources. Here too, the resource scarcity accentuates a need to not only leverage the individual values of existing resources, but also to give them new and anomalous meanings through improvisation, as and when required. Cases in point are the varied and extensive usage of PET bottles in India, and metal wires in Brazil, both of which are particularly popular in the respective countries for their versatility. The higher end of the scale reflects daily situations which may optionally require improvisation as a consequence of momentarily unavailable resources, such as making various rigs for DSLR photography, or colour coding keys with different nail polish colours.

•**Determinant 2. Scale of Impact:** The scale of impact recognises the intended legatees of an act of improvisation, and its range levels up from individual to global. Thus on one hand we have examples of everyday ingenuity where the improviser's efforts are directed towards the self, such as tying hair with a pencil, or slicing hard-boiled eggs with thread. On the other hand, improvisations such as Kludging (Granholm, 1962) in software technology have the propensity to involve global audiences, aided by the unprecedented reach of the internet as well as other extensive modern day distribution channels. Simultaneously, the impact mapping of such instances showcases the mainstream nature of unscripted enterprise, putting into perspective persisting discernments of the associated cultures and practices as isolated or pejorative.

•**Determinant 3. Resource Availability:** The relative resource situation is regularly a pivotal factor for gaging the extent of improvisation in a respective scenario. In many cases, although not strictly, a critical limitation of resources reflects the desperateness of corresponding circumstances, but alongside proffers conducive platforms to enfranchise genuine and un-indoctrinated creativity. On the other hand, a putative state of resource abundance hypothetically nullifies any compulsion to improvise, unless an importunate need is introduced, such as a lack of time, or an inadequacy of knowledge and/or suitable expertise. A lack of resources can also be monetary, which may demand greater resourcefulness through the acquiring of standard and easily accessible materials, in order to address certain related exigencies.

•**Determinant 4. Quality of Solution:** This determinant acknowledges the vast spectrum of contrasting quality standards that can be attributed to the ensuing solutions of improvised activities, and is by itself dependant on a number of factors. Since the solution is effectively the culmination of an associated creative process, each stage and attribute of the process has a direct bearing on it, including all above mentioned determinants. Other critical factors which are influential to the end result relate to the applicable knowledge and expertise pre-existing with the improviser. These affect the fluency with which an improviser reacts to and interacts with a given situation, which in turn reflects in the legerity of the process, and the standard of the final outcome. It may be noted here that the research considers it its prerogative to recognise an improvised outcome as final singularly on the basis of its uncompromised deliverance to the established need, failing which it is not considered as a final outcome, but a prospective solution that is in line for

being built upon through further stages of incremental improvement, or for being discarded altogether. These determinants are aimed at providing a workable understanding of the nature of an improvised action through the encapsulation of the expanses of various dynamics in play, and can be graphically summarised by the use of an Improvisation Rangefinder, as described in the following segment.

1.1 **Improvisation Rangefinder**

The Improvisation Rangefinder is essentially a graphical representation of the perceivable scope of an act of improvisation, and has been developed as a visualizer for phenomenographic analysis during this research. It considers all four determinants and their eight corresponding individual points of extremity within a single arrangement to yield a figurative plat which can then serve to position a particular act of improvisation within a wider spectrum of improvised activities. Its particular schematics are as follows:

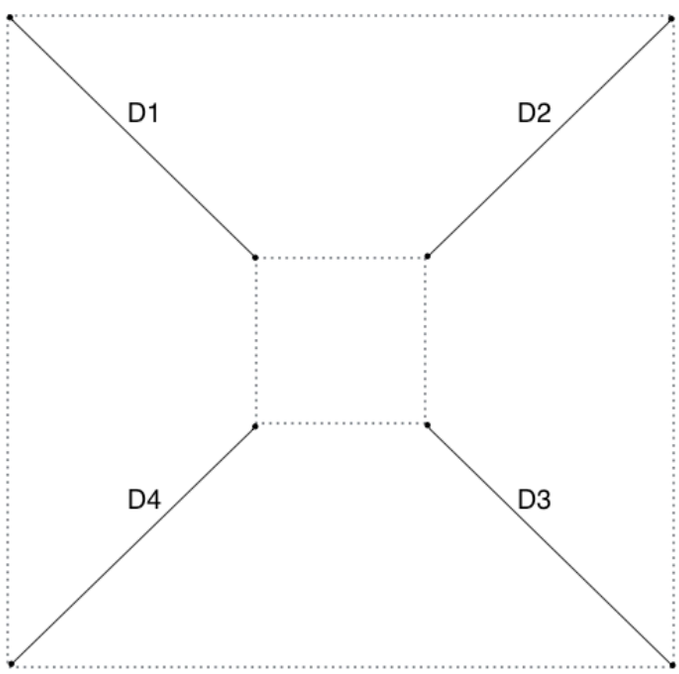


Figure 1.01 – Determinants scale of the Improvisation Rangefinder

The four corners of the inner wall represent the lower extremities of the four determinants, and those of the outer wall represent the higher extremities. The solid lines which connect each lower extremity with their corresponding higher one, indicate the overall scale of the determinant, on which the respective extents can be identified based upon the available evidence.

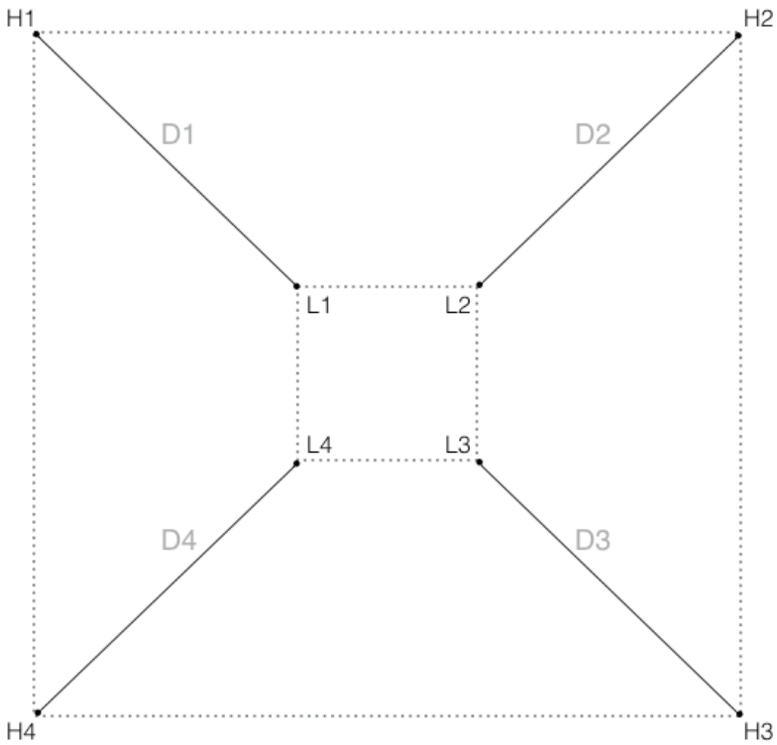


Figure 1.02 – Determinants scale of the Improvisation Rangefinder with extremity points

• In the case of Determinant 1 (D1), the scale represents situational urgency, wherein the lower extremity (L1) stands for circumstances which necessitate immediate or urgent action, and the higher one (H1) is indicative of a scenario of optional improvisation.

• For Determinant 2 (D2), the lower extremity (L2) represents an Individual scale of impact, whereas the higher extremity (H2) suggests a multi-nation radius of impact.

• The lower (L3) and higher (H3) extremities of Determinant 3 (D3), in terms of Resource Availability, respectively, are In-Propinquity, and Standard Availability.

• And finally, the Quality of Solution scale (D4) includes Provisional, and Saleable as the lower (L4) and higher (H4) points of extremity respectively.

Once the extent of an individual case is deemed a point along each axis of the four determinants, points are then linked to form a quadrangle - or the figurative plat - which graphically proposes the gross appraisal of the act of improvisation in light of perceivable factors.

To gain a greater understanding of the above, the following examples can be considered.

Figure 1.03 – Colour coding of keys using nail polish

Figure 1.03 presents an act of improvisation where a set of keys has been colour coded with nail polish presumably to differentiate them from each other, if not to link them with their corresponding locks that may have undergone a similar treatment.

Figure 1.04 – Improvised boat in flood

Figure 1.04, on the other hand, is an image of a flood victim who utilises a large cooking vessel as a makeshift boat along with a bamboo pole to wade through flooded areas.

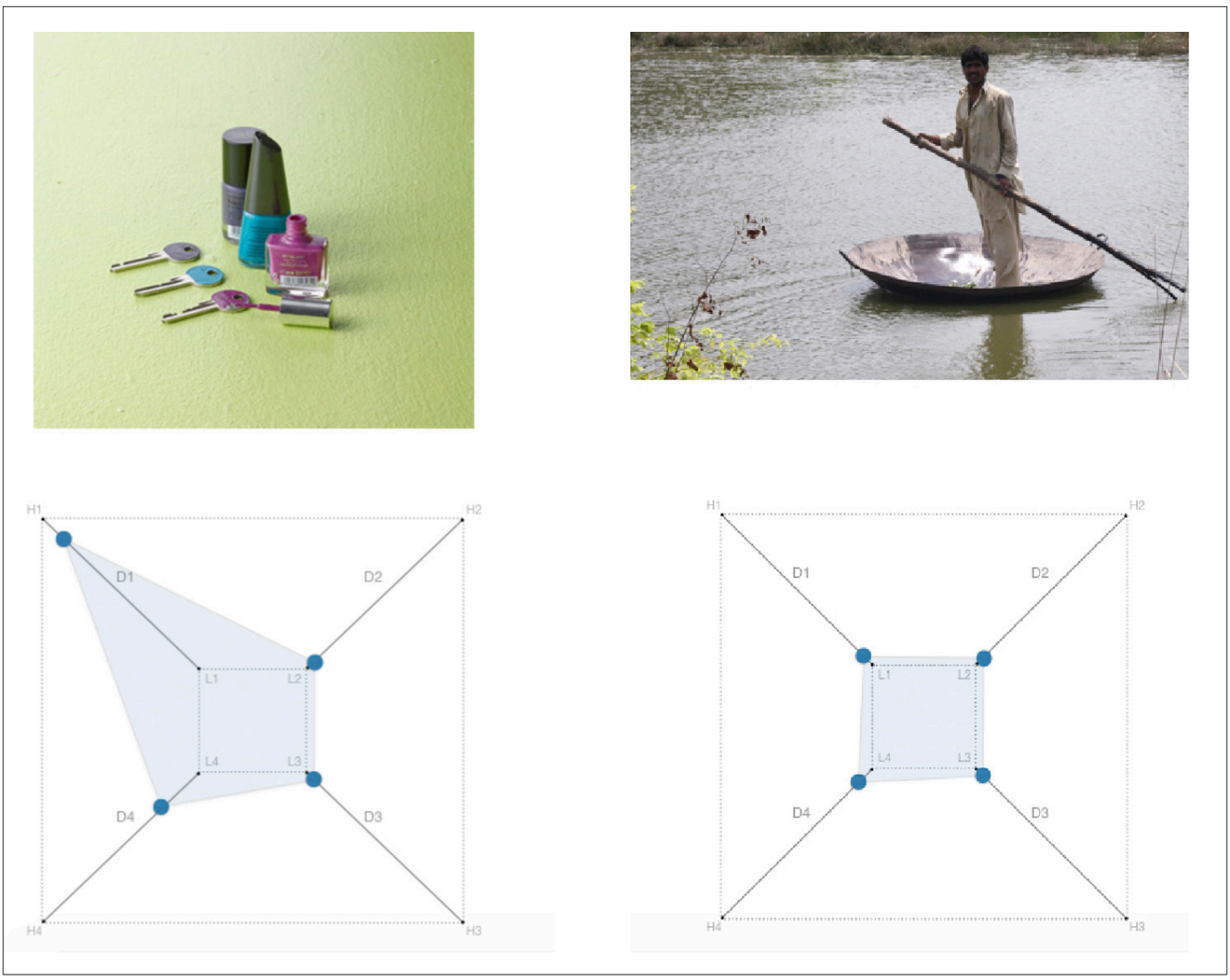


Figure 1.05 – Comparison of plotting on the Improvisation Rangefinder

We begin plotting on the Improvisation Rangefinder by taking into account the first determinant, which is the Scale of Need. In the case of the keys, the need is not necessarily severe, but provides the notion of a corrective measure in response to an ongoing or pre-empted discomfort. Improvisation in the case of the second example, however, is perceivably borne out of a greater crisis.

Determinant 1 (D1) range for the first example can thus be deemed a point favouring the higher extremity as a prevailing scenario, whereas the dire exigency of circumstances exhibited in the case of the second example, is closer to the lower extremity, namely, situational urgency. Subsequently, the grading for Determinant 2 (D2), or the Scale of Impact, is similar, since both actions are conceivably aimed at conveniencing the self first, with the possibility of extending the advantage to a limited number of others, if any. Although an additional probability of a larger scope of impact exists in speculation of inspired replications, however, it cannot be factored in since it is not an originally intended consequence on behalf of the improviser, whose foremost interest of engagement is to address a specific need.

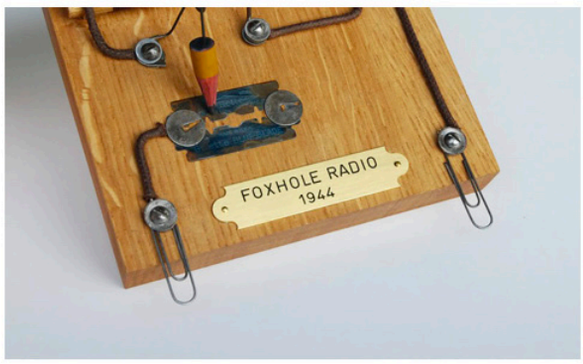
Similarly, for the corresponding determinant relating to Resource Availability, improvisers in either case exhibit a comparable proclivity for employing resources which are commonplace and readily available. however, in terms of Determinant 4, or the Quality of Solution, the second example's concluding output is clearly more provisional, and meant for a short time-frame than that of the first example, and hence its affinity towards the scale's lower extremity is marginally more pronounced.

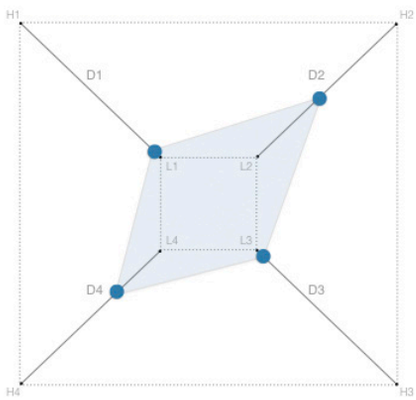
In the same manner, a sample size consisting of 75 individual instances has been mapped, which helps yield distinctive patterns on the rangefinder that in turn contribute towards understanding the notion of improvisation through three broad agglomerations:

▪ **Improvisation in Emergencies:** In consideration of the direness of the related situations, the mapping exhibits closeness of the plotted points to the lower determinants in each of the four scales, thereby implying urgency of action, an individual or closed radius of direct impact, limited availability and lesser choice in terms of resources, and a fundamentally provisional nature of the subsequent solutions.

▪ **Everyday Improvisation and Cultural Patterns:** This forms the majority group amidst all the examples plotted, and represents acts of improvisation in day to day living, where the plotting is fluid across scales, except in the case of D1, where the plotting reveals a clear preference towards H1.

▪ **Improvisation in Business and Social Entrepreneurship:** Here, there are perceptible spikes in D2, D3 and D4, implying that the related solutions are meant for a larger radius of impact, the materials are standard and often purchased, and the quality of the solutions is acceptable enough for either replication or sale.





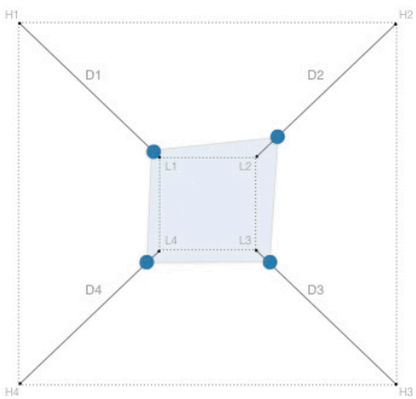
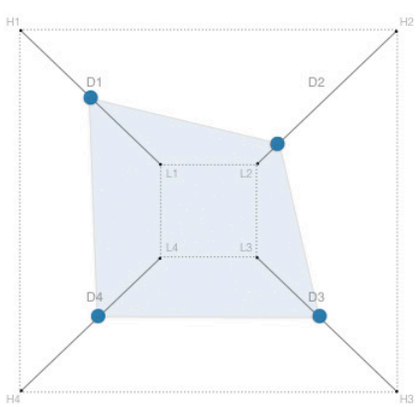
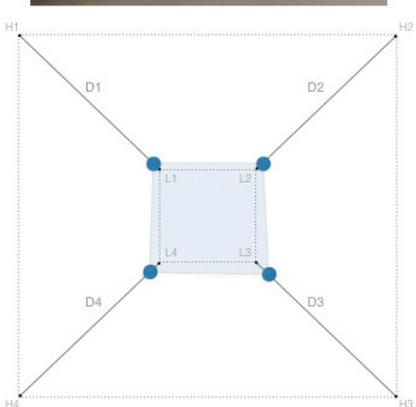
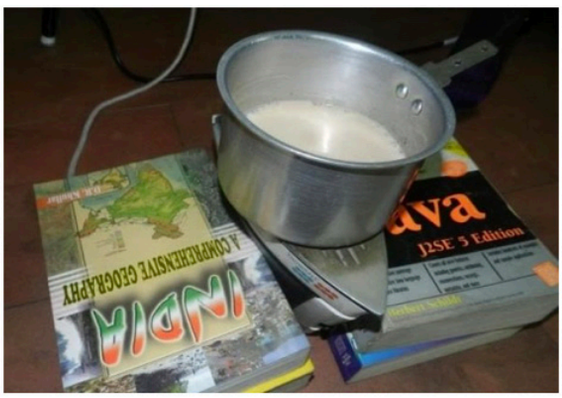


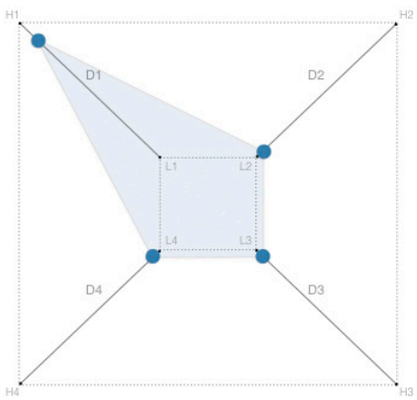
Figure 1.06 – Mapping of Improvisation in Emergencies

Property of Museum of History & Industry, Seattle









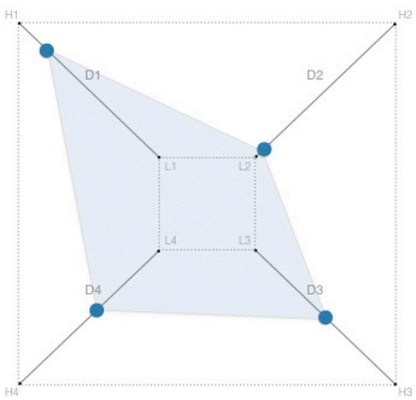
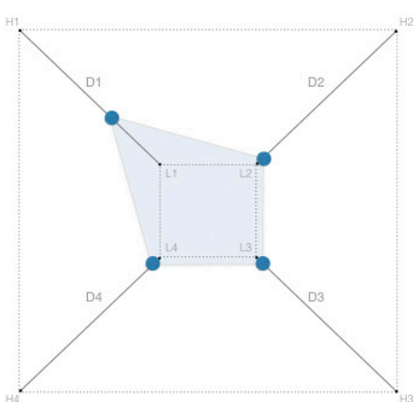
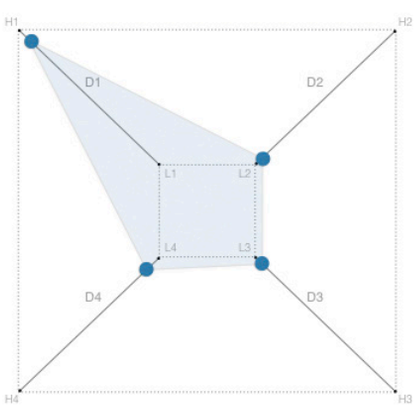
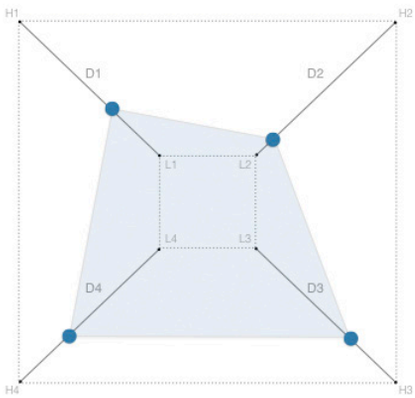


Figure 1.07 – Mapping of Everyday Improvisation







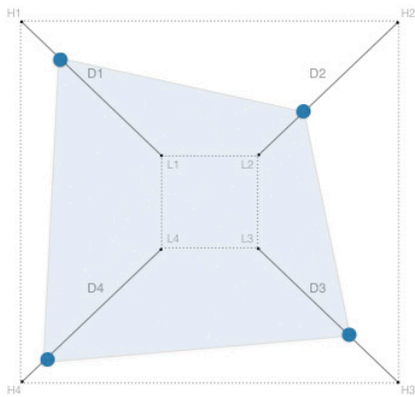
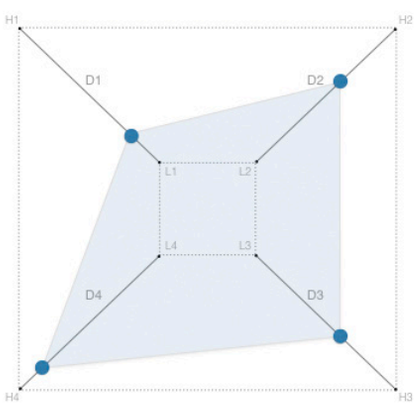
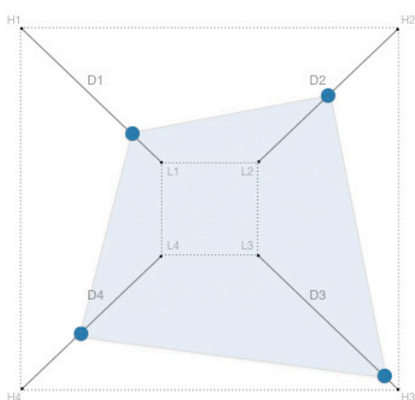


Figure 1.08 –Mapping of Improvisation and Business and Social Entrepreneurship





In conclusion, the research would like to iterate here that the improvisation rangefinder is the first contribution of this thesis. The plat is adaptable, and can be used for analysing any act of improvisation, irrespective of scale. The determinants which have been identified, are the dimensions which the research considers as foundational to understand ad-hoc ingenuity, however, with the analysis of further examples, more determinants are bound to be added to expand our comprehension of the phenomenon of improvisation. The typologies that emerge from the analyses of the plotted examples are discussed at length in the corresponding chapters.

Chapter 2

Improvisation in Emergencies

"The struggle for life, the struggle for survival, will wake up human creativity and desire to create something out of nothing. There are many examples. Not necessarily beautiful, but they served its purpose. "
(Kenan Begić, Kosovo War survivor, n.d.)

Desperate times have a knack of instigating desperate thinking. In this section, I focus on certain cases among innumerable in point, which succinctly exemplify an against all odds approach to design and creativity, veiled and enmeshed in the act of survival. In dire situations, as in the cases of the ones described below, to experience a sense of fear, resignation, and foreboding is natural. However, for the purposes of this thesis, I concentrate on specific times when individuals, including ourselves, have been able to push through and overcome not only fear, but also the demands of the situation, either by the force of sheer determination, or through arriving at the crucial mental juncture of having nothing to lose. What is wished to be emphasized from this is that every time we emerge from such consternation, we are subliminally granted new learnings about ourselves, including the understanding of various thresholds of personal potential, as well as our ability to exercise situational control. In many of these situations, an artistic taste which is inherently incorporated in the traditional notion of creativity is tended to be seen as somewhat of a luxury, unless the situation demands certain aesthetically tuned elements, and any predisposition to beautification otherwise is plainly sacrificed at the altar of efficiency and practicality. An argument which can be made in this regard is that this form of creativity is not sequestered in any form to the traditional notions, in consideration of its raw and chaste nature of self-expression, as is evident from each of the following cases which reflect not just another frivolous emotion but a threadbare zeal to survive.

Figure 2.01 – An improvised torch fashioned from a dynamo and a bicycle headlight

2.1 **Sarajevo Survival Tools**

The Sarajevo Survival Tools exhibition of 2010/11 held at the Historical Museum in Sarajevo, presented a diverse collection of improvised tools and objects made by under siege civilians during the conflict years of ‘92 to ’96. Begić, a survivor of those tumultuous times, would have had a first-hand experience of making and using these tools, and thus it is precisely this reason why the observation of his in the beginning of this chapter may serve to orient its course. The tools themselves are mostly unique, plausibly “limited edition,” and both individually and collectively summarize the extent of human resourcefulness in conditions of dire adversity. Notable objects include a watering-can made from a used tin of oil, dynamo powered torches, improvised stoves, toys, and also weapons. Though lacking conventional aesthetics, the products are mostly well thought out, and some are even known to have commanded a barter value, thereby even indicating the possibility of being marketable.

Figure 2.02 – A watering-can made from USAID cooking oil tin and a shower fitting

UK's Guardian noted while covering the exhibition about how "the objects attested to the citizen's bottomless ingenuity, and represent a design culture that has nothing to do with leisure, technological progress or social mobility but, rather, survival" (McGuirk, 2011). However, an implicit ambiguity in their understanding of the word Design becomes evident when they go on to suggest the association of these objects to "cunning DIY culture symbolic of civilizational breakdown," in stark contrast to designed objects which epitomize "technological achievements" and the "talent for pleasing forms." The comment, while recognising DIY activities as a cultural phenomenon, does not clarify whether it refers specifically to improvisation as evidenced from this particular instance, or to improvisation based DIY practices in general. However, its attribution to desperate feats of survival as something devious, and epitomising a deconstruction of 'civilised' order highlights the generic apathy—or conscious disregard—towards a "design culture" that has as much to do with leisure, technological progress, and social mobility, as it does with survival. And if the evident rampancy of this culture of design is to be taken into account, a fact that this research is keen to highlight, then instead of being contrasted with designed objects of pleasing forms, as a coexisting emplacement it should serve to expand our overall understanding of the phenomenon of design.

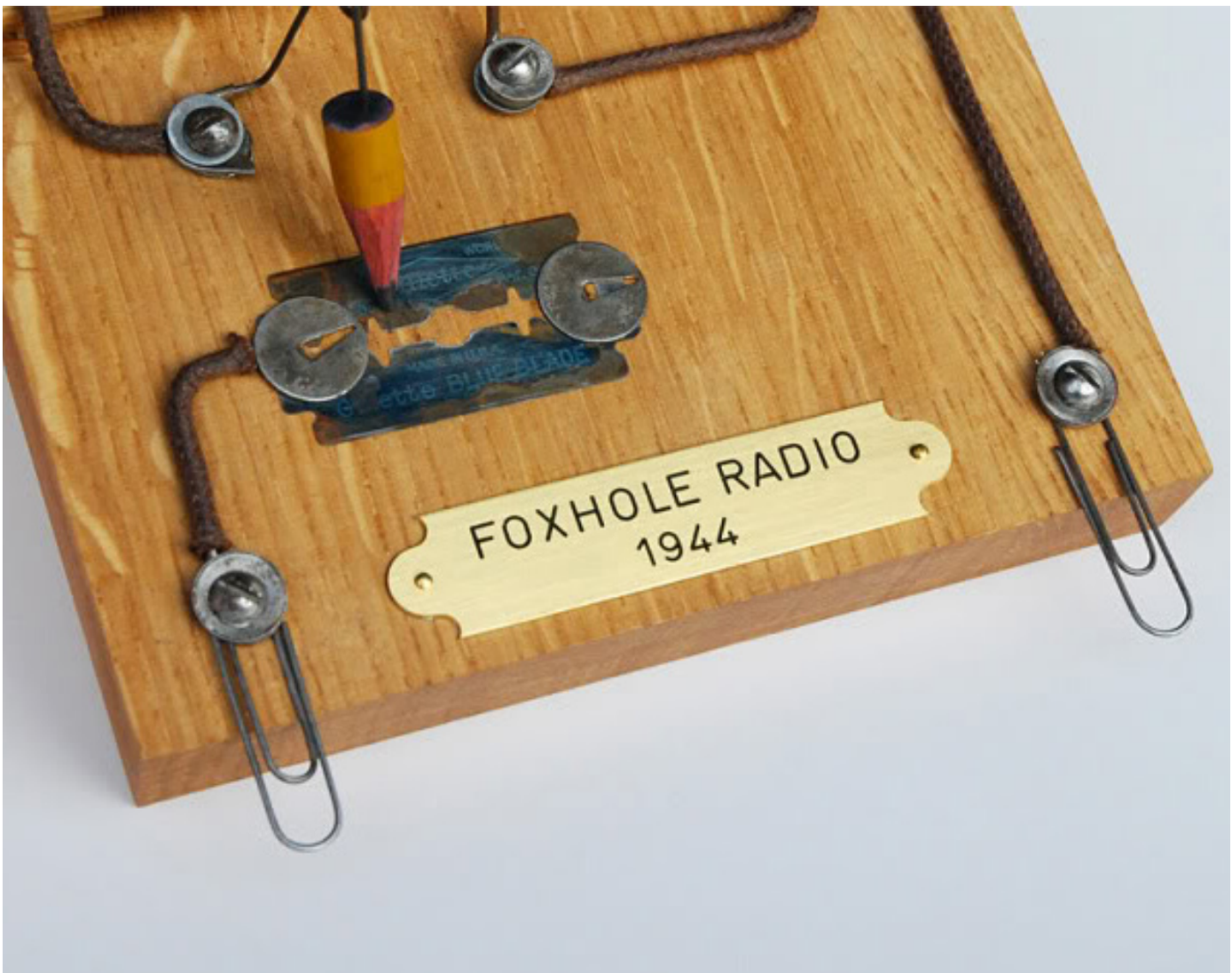


Figure 2.03 – Replica of Foxhole Radio Set

2.2 **The Foxhole Radio**

There is a prospective case to be made for the origin of the legendary World War 2 era radio, the Foxhole, to lie in the publication of Construction and Operation of a Very Simple Radio Receiving Equipment by the Washington based US Department of Commerce Bureau of Standards (Bureau of Standards, 1922, p.1) roughly two decades prior to the stalemate between the Allied and the Axis Powers at Anzio in 1944.

The document outlined how using readily available materials, amateur radio enthusiasts could build and operate their own crystal radio-receiving outfit. The pamphlet introduced the outfit as being able to receive radio content in the form of coded messages, music, and voice, and costing between €10 and €15 to assemble.

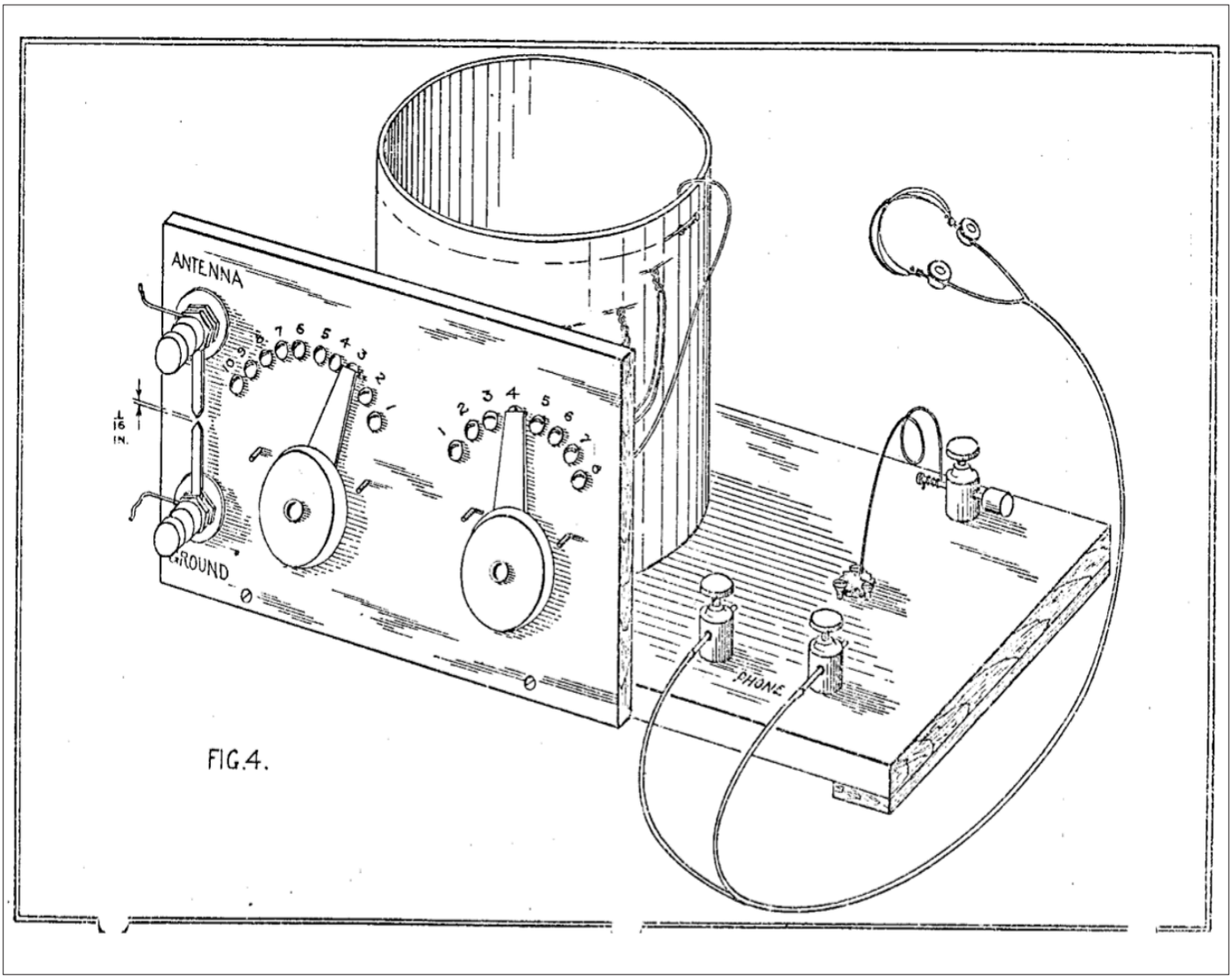


Figure 2.04 – Diagram of Crystal Radio

The original Foxhole radio that was put together by an American soldier (New York Times, 1944) during the Anzio stalemate, shared technical attributes of the above DIY radio outfit, however in the absence of regular materials, it was contrived from discarded or unrelated materials such as razor blades, pencil tips, and paperclips, for the precise purpose of being able to tune into news from stations in Rome and Naples.

These materials managed to attain the intended functionality by effectively mimicking the required properties, although the solution could only be made practicable by the efforts of a practitioner who was skilled and knowledgeable in crystal radios. The foxhole radio was subsequently replicated in many forms throughout the duration of the war and came to contrast the Turing machine as a symbol of human ingenuity and resilience in the face of high adversity.

Figure 2.05 – ‘Shivs’ by Brett Yasko

2.3 **Improvised weapons in prisons**

More poignant illustrations of ingenuity in desperate circumstances can be found in prisons and detention cells from the world over, which in addition to their formal duties, routinely substitute as arenas of unbounded creative expression. An intriguing rumination which can be made in this regard is that the represented situation is one of direct engagement between two manifestly contrasting ideologies, which may be relatable to design: One which seemingly seeks the prominence of order over chaos; and the other, which embraces chaos and attempts to simply manoeuvre it for survival and sustenance.

It may prove pertinent to consider this aspect particularly in the ambit of Service Design, where in two distinct polities are perceived to be in constant endeavour to negate or supersede the other, however it is pertinent for this research to concentrate on the "artifactual objects" (Miner, Bassoff, and Moorman, 2001, p.7) that are fashioned by prisoners as a practical component of their decided nonconformity with persisting restrictions. This is because it provides a clearer indication of the context, which in most such cases is the predicament of being detained for an x period of time, with inimical factors such as the sentence period, accompanying exasperations, comminatory co-occupants among others, and contributes healthily to the proliferation of a Machiavellian mindset that is conducive to both Situated Cognition (Brown, Collins and Duguid, 1989, p.38) and Situated Action (Suchman, 1987, p.35).

This photo-series features improvised weapons, or "shivs" confiscated in the 1980s at Rahway (today known as East Jersey State Prison), a maximum-security penitentiary.

Top-Left > "Unbreakable" plastic comb; three single-edge razor blades inserted into teeth; wrapped with copper wire and shoelace.

Top-Right > Gardening glove with smaller glove inside; four steel upholstery tacks, each with three sharp points exposed, sewn between gloves.

Bottom-Left > Wood strip; five large razor blades glued into one side; six small razor blades glued into other and wrapped with boxing tape, rubylith and clear tape; handle wrapped with boxing tape.

Bottom-Right > Stainless steel tablespoon; handle wrapped with upholstery.

Figure 2.06 – Escape Tools by Marc Steinmetz

Top > A Shotgun made from iron bedposts; charge made of pieces of lead from curtain tape and match-heads, to be ignited by AA batteries and a broken light bulb. From Celle, Germany (Steinmetz, 1999).

Bottom > A tattoo needle made from a toothbrush handle, a ball pen and an electric motor; confiscated in 'Santa Fu' prison in Hamburg, Germany (Steinmetz, 1999).

Figure 2.07 – Survivors wade through floodwaters brought about by typhoon Mirinae at Santa Cruz, Laguna province, south of Manila, Philippines

2.4 **Coping with natural disasters**

Natural disasters, much in the same way as wars or economic emergencies, characteristically leave in their wake situations of extreme exigency, and improvisation is employed in various capacities by victims and volunteers alike to cope with the aftermath. According to Tierny (2002) and Kreps (1991, p.36), improvisation plays a fundamental role in disaster management, however, the general perception towards improvisation by rescue forces is unfavourable from various disaster management entities since its employment is considered as a failure of existing contingency plans (Drabek, 2001, Wachtendorf, 2004, Wachtendorf & Kendra, 2005, cited in Wachtendorf & Kendra, 2007). Albeit, Kendra and Wachtendorf (2007) argue that whereas disaster management plans project “what ought to be done”, while residing outside the situation, improvisation insists on “what needs to be done” while experiencing the situation first-hand, which is why it demands further respect and acknowledgment from the respective presidium.

Radjou, Prabhu, and Ahuja (2012) describe the true nature of Jugaad as an instinctive predilection

In the aftermath of the Gujarat Earthquake of 2001, most of the Mansukhlal Prajapati's inventory of clay pots and vessels got destroyed. As news agencies flocked to his village to cover stories of the destruction and its survivors, one article in particular depicted Mansukh amongst the rubble of his clay pots with a caption reading, "The fridge of the poor breaks into pieces." These words got him thinking
(Kyle, 2014).

Figure 2.08 – Mansukhlal Prajapati with his creations, including the Mitticool refrigerator in the background

to leverage what is already there, instead of reinventing the wheel and developing everything from scratch again and again. To illustrate his point, they introduced the case of Manshuklal Prajapati, the inventor of the low-cost refrigerator called Mitticool. Descended from a long line of traditional potters, his claim to fame materialized in the form of *Mitticool* (*Mitti* meaning earth in Hindi), an electricity-free refrigerator made from clay which employed natural evaporation to keep consumables cool.The broader concept, although presented in a novel fashion, was a pragmatic evolution of the humble earthen pot, used till date in villages throughout the Indian subcontinent to store and cool drinking water. The idea for the invention occurred to him when, in the aftermath of a devastating earthquake in his native state of Gujarat, an observer lamented the loss of his 'refrigerator', an earthen pot, among other valuables. Prajapati, taking a cue from the observer's annotation, created a simple and affordable product which eventually reached out to hundreds of thousands of rural homes around the country, and made a positive change to an aspect of the lives of people who cannot afford an electric refrigerator, and/or have intermittent supply of electricity. Mitticool and its subsequent interpretations are achieving significant 'real world impact', however, Manshuk may live the rest of his days believing that the word 'design' is just an attribute of his wife's nylon saris.

2.5 **Hoovervilles and Shantytowns**

The Great Depression is synonymic with years of debilitating economic hardship in the industrialized Western world, and the emergence of impromptu shanty towns across the United States of America called Hoovervilles was a direct consequence of the large scale unemployment and homelessness which was prevailing at the time (Arbuckle, 2017).

> *With lodging houses overflowing, improvised shantytowns sprang up across the country. On vacant lots, public land and in empty alleys, unemployed people cobbled together huts and shacks from wood and scrap metal. Some of these villages held as many as 15,000 people. They were popularly referred to as Hoovervilles, after the Republican president in office during the onset of the Depression who was widely blamed for the economic meltdown.*
> *(Arbuckle, 2017)*

The Hoovervilles, and their surviving ilk in many parts of the developing world essay yet another example of extemporization in a situation of indigence, where building a shelter to guard against the elements becomes the first course of action towards survival. Here too, ground realities dictate creative utilization of available resources, since both building materials and construction expertise may be in short supply.

Figure 2.09 – Hoovervilles, USA.
1931 - 1938
Source (Top to Bottom): History.com ; Washington.edu ; Mashable

"Hooverville shanties were constructed of cardboard, tar paper, glass, lumber, tin and whatever other materials people could salvage. Unemployed masons used cast-off stone and bricks and in some cases built structures that stood 20 feet high. Most shanties, however, were distinctly less glamorous: Cardboard-box homes did not last long, and most dwellings were in a constant state of being rebuilt. Some homes were not buildings at all, but deep holes dug in the ground with makeshift roofs laid over them to keep out inclement weather. Some of the homeless found shelter inside empty conduits and water mains."

(history.com, 2010)

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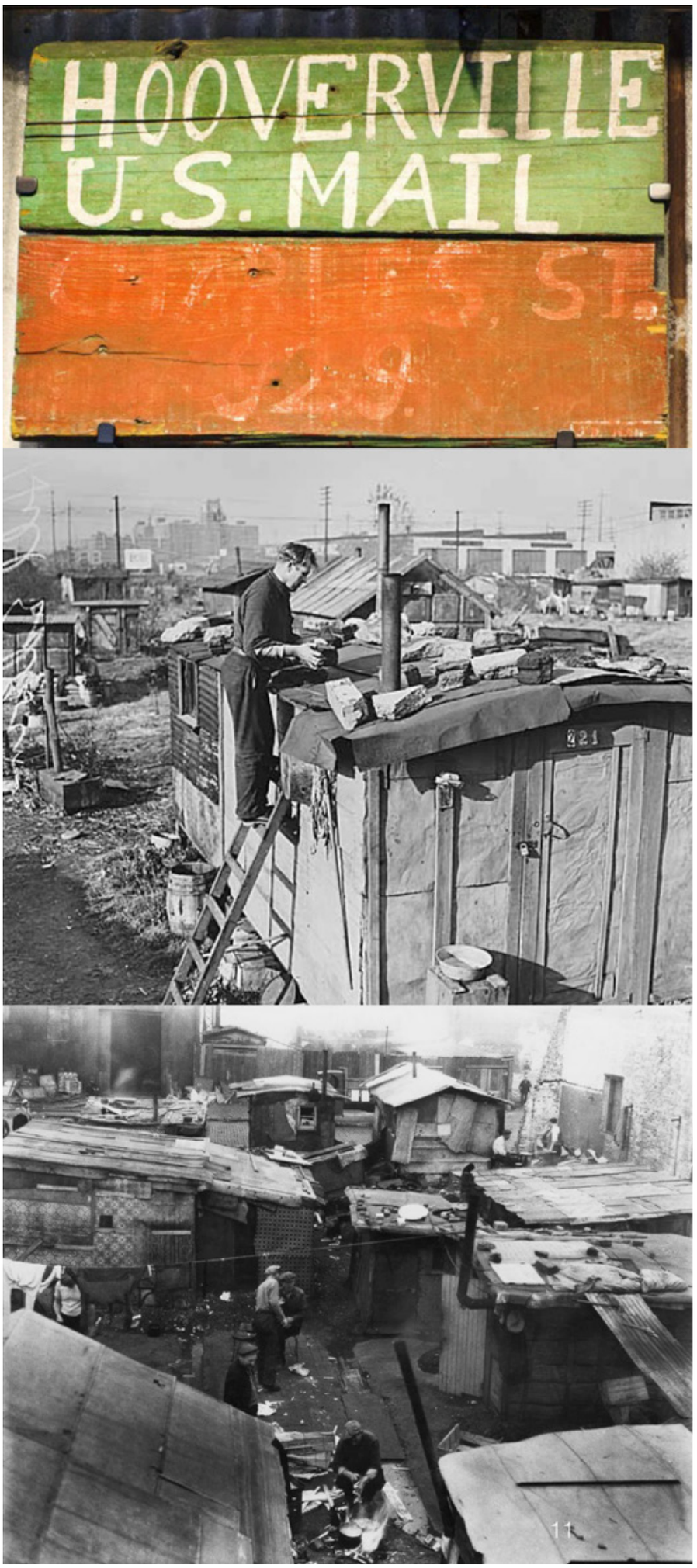

HOOVERVILLE
U.S. MAIL

2.6 **Inference**
Deconstructing the elemental determinants

In conclusion, extreme adversity has a profound effect the improvisers' approach, both consciously and subliminally. The corresponding actions for mitigating the relative circumstances exemplify a design process that is laced with both critical and primal intent. If the simultaneity of planning and implementation is considered as a constant in all types of improvisation, then the severity of the circumstances cause a heightened state of mindfulness in either.

Additionally, the prevailing adversity demands a clear focus of the objectives, and as a matter of course, rigorously eliminates preoccupations that are either extraneous or counter-productive to the aims. The common theme, in relation to the resulting artefacts, draws remarkable parallels with the Lévi-Straussian concept of Bricolage (1962), particularly when the elemental dimensions that appear to be in play are examined – the aim, the mindset, the methodological elements, and the nature of handling tools and materials at hand.

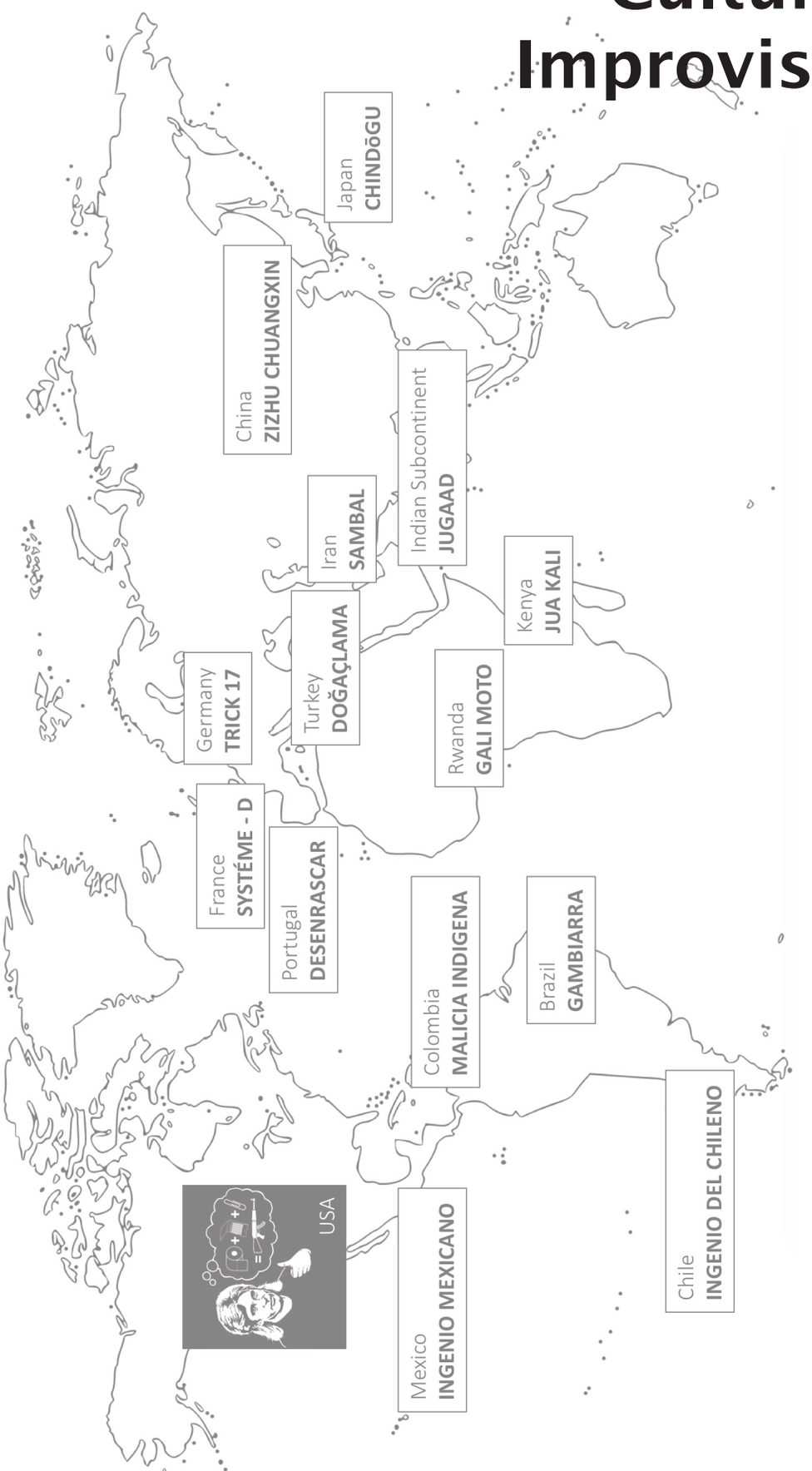
The lifespan of the enterprise in each case is determined by the aim, which in the form of the first operable attribute of the creative process is evident, for example, in the case of Sarajevo survival tools, where most of the recombined objects have acted as solutions specific to the period of conflict, before being replaced by more conventional alternatives. Accordingly, the aim or the motive is usually singular and characteristically contingent.

The second, and effectually the most critical attribute of this offbeat creative process is the spontaneously arising dialogic space between the protagonist and the situation, as characterised by:

1) Having the need/desire to combat or negate situational demands for eventual betterment, even if marginal.
2) Conducting an instinctive assessment of personal strengths and weaknesses, knowledge, and experience to realise any relevant potential for solving the task at hand.
3) Making a sharp appraisal of all available material resources and/or personnel support, and to determine their value to the objective.
4) Proposing abstract possibilities to generate ideas, based on above estimations
5) Critically processing the generated ideas to arrive at prospective solutions

The final attribute concerns the nature and disposition of the solutions, which are individually unique and rarely perfect, but offer malleability to undergo rapid cycles of incremental improvement till a good enough functional state is reached which addresses the specific need unconditionally.

Cultures of Improvisation



Cultures of Improvisation

Kenan Begić's poignant observation from the previous chapter suggests three key areas of inquiry, namely, the activation of a basic human instinct to survive in times of stress; the channelling of creativity as a mode of liberation; and subsequently, the ability, gumption, and mindfulness to utilize unconventional means for putting together a feasible solution. These three aspects in conjecture advocate the legitimacy of a primal quantum within the scope of creativity which may prevail alongside conventional notions but may also hold the possibility of being fundamentally particular.

The conventional understanding of creativity places a relaxed, stress-free environment among the central requirements for any measure of meaningful efflux (Epstein, cited by Novotney 2009), but this rationale majorly takes into account the higher arts such as music, literature, and design, where methods, plans, and periods of incubation are deemed necessary for inspiration, ideation and experimentation. However, a counterargument can be made on the basis of everyday examples when creative actions are taken in situations of sudden duress, and also contribute to notion of creativity despite an apparent lack of luxuries such as incubatory terms, or resource abundance. In light of situational exigencies, these creative extrapolations seem instinctive and lighter, rather than being dependant on a protracted process of heavy cerebration.

If appropriateness is indeed central to the existence of creativity (Sawyer, 2012), then the above argument may hold ground not only as a knee-jerk reaction particular to times of stress, such as wars or natural disasters as discussed before but also as a key constituent of various DIY type street innovation practices that persist around the world in differing forms. Depending on the culture, and/or situation, individual DIY practices may have an associated negative or positive connotation, however, the underlying rationale is often always to do as well as possible under conditions which are not entirely satisfactory. In the following section, the research considers a selection of such cultures of improvisation and examines aspects in which they are fundamentally common or unique.

6 litros

Figure 3.01 – An Auto-rickshaw Jugaad for a temporary fuel tank using a PET bottle

3.1 **Jugaad (India)**

The term Jugaad is a compound word in Hindi meaning an improvised automobile, but it is also used as an umbrella term to denote the overall culture of improvisation in India. Literal examples of spontaneous interventions abound in the Indian automobile sector, and hence it becomes a natural source of the nomenclature.

A common example of Jugaad can be seen in the widespread repurposing of empty PET bottles (of all capacities) as makeshift fuel tanks, especially for smaller two and three-wheeled vehicles such as bicycles, bicycle-carts, or tuk-tuks. An interesting observation which can be made in this regard is that even though the quality of such setups is temporary, the PET bottles prove to be surprisingly durable, and thus their period of usage is routinely dependent on the overall objective of the maker/owner.

For example, in the case of street hawkers who use such DIY means to semi-mechanize their otherwise manual bicycle-carts, the PET bottles serve as the only available alternative and are thus intentionally used for a prolonged length of time. However, it is also common to see the bottles being used in combination with considerably more advanced mechanics of tuk-tuks, in course of making short journeys to repair shops for being replaced with more unitary solutions.

Jugaad is thus essentially a characteristic trait of doing what needs to be done ingrained in the Indian populace, conceivably owing to past and prevailing hardships. The ever-burgeoning competition for resources breeds a constant compulsion to calculate the effective worth of most quotidian objects and aspects (including considerations for monetary and utilitarian values, both real and perceived, as well as at times the required physical effort or worthiness). This is reflected in the quirky improvisations to repair and repurpose common items, however, the affiliated mindset also spills over to non-material concerns (such as giving bribes). The opinion of Jugaad generally though is neither inclined towards being overwhelmingly positive, nor negative. Often, Jugaad falls within the ambit of common sense, which is undoubtedly subjective and may vary significantly between practitioners.

To illustrate how enmeshed the philosophy truly is in the social fabric, the researcher seeks homology in personal experience. Primary acquaintances with Jugaad happened in early school, when during a subject called craft, a practice called Kabaad se Jugaad (improvising from junk) was regnant, wherein the students were provided sets of random objects, mostly bi-products of consumer goods such as empty cartons and plastic cups, and were expected to develop conceptual household objects from them. In retrospect, it reflects an educational system which at grassroots level not only dismantled any lingering misapprehension of abundance but also cultivated a naturally creative and counterbalancing concept of Jugaad (albeit alongside the field of product design) to help overcome Murphy's law.

In the recent past, noteworthy writers such as Pattanaik (2008) have criticised Jugaad as being more people oriented and less system oriented, calling for further alignment with processes and respect for rigidity of systems. However, as will be explained further in a corresponding section on the relationship between improvisation and sustainability, Jugaad is one of the foremost reasons why an average Indian has a comparatively low material footprint on a global scale.

Figure 3.02 – A Desenrascado watermelon seller

3.2 **Desenrascar (Portugal)**

The literal meaning of Desenrascar is to ‘disentangle’, however, it is popularly used for describing a life hack or an impromptu creative solution to a situational inconvenience. In Portugal, it is thought of as a national idiosyncrasy, although its attribution is generally directed to an earlier era when such practices were more rampant in the day to day life. Its exact history is not ratified, though what the thesis gathers from the researcher’s personal interaction with the Portuguese public on the subject is that this term is symptomatic of the supremacy of Portuguese resourcefulness in the area of seamanship, which came to fore in the times of colonial explorations.

The Portuguese were highly regarded for their prolific skills in tacking and jibing, especially in calamitous weather conditions, and thus became indispensable crew members of not only a seafaring Europe but also Japan, according to local lore. Thus, to ‘disentangle’ may have had a literal rooting in physical cordage in the context of sailing, which may have then extended in terms of connotation to crafty

Figure 3.03 – Sights of daily improvisation are still common in Portugal

wrangling of tricky situations.While conducting Designrascar workshops with university students in Porto, the researcher regularly used to derive amused reactions from students when explaining Desenrascar and its relevance to the research, which may have been due to a combination of many factors (including routine mispronunciation). However, a possible explanation which could be made in this regard is that as a foreign student, since researcher was engaging with a phenomenon that was ostensibly and deeply provincial, the corresponding association may have seemed anomalous.

Also, while the practice may have been more commonplace at an earlier time, the younger generations did not exhibit an equal amount of compulsion or direct association to it as their Indian counterparts in the case Jugaad, though the width of local examples gathered suggest that the practice is still robustly prevalent.

Figure 3.04 – Two Brazilian passions, Grill and Gambiarra

3.3 **Gambiarra (Brazil)**

Possibly the biggest acknowledgement and advertisement for a homespun culture of improvisation was made during the Rio Olympic Games of 2016 when the world came to know and witness Gambiarra as one of the major themes for the opening ceremony (Grohmann, 2016). The word Gambiarra translates to an 'extension of light', but it is typically used in the context of material culture to signify the 'Brazilian way' of setting up an improvised article (Boufleur, 2006), or as the organisers of the opening ceremony reportedly put it, "the Brazilian talent for making something out of nothing" (King, 2016).

Boufleur (2006, 2013) provides further insight into the constitutional components of this cultural propensity by defining it as:

Figure 3.05 –Adaptation for rubble disposal during renovation of a building in Paraná, Brazil

> *Technical re-appropriation of materials, a way to use or to constitute artefacts by the means of an attitude which is predisposed to differentiate, improvise, and make necessary adaptations, adjustments or transformations with available material resources, most often with the objective of solving a specific need. It is possible to understand this attitude as immediate projective reasoning determined by momentary circumstances.*
> (Boufleur, 2006, 2013)

Despite a few such objective standpoints on Gambiarra, the majoritarian outlook in Brazil towards its occurrence continues to be negative. Although Gambiarra is a concomitant feature in many modern day professional spheres such as computer science, programming, electronics, civil engineering, filmmaking, theatre, fine arts, and architecture (Boufleur, 2006), its prevailing frame of reference still lies in solutions often castigated as unplanned, temporary, and precarious, as well as epitomising “fraudulent connections” (Houaiss, 2001) and “extra-conjugal relationships” (Navarro, 2004).

Figure 3.06 – A typical Jua Kali workshop in Nairobi, Kenya

3.4 **Jua Kali (Kenya)**

Jua Kali or 'being under the heat of the sun', represents informality, especially in the context of the Kenyan unorganised economic sector. Swigert-Gacheru (2011, cited Indimuli et al. 2017) relates to Jua Kali as "the way artists (alongside traders, hawkers, mechanics, spare part dealers, metalworkers, craftsmen, and service-repairmen), who ply their trade on streets or open-air markets, living on a shoestring budget, and using their imagination to create works of art that display their originality, adaptability, resourcefulness and improvisational style of 'makeshift creativity'".

The creativity spills over to small-scale production of goods and equipment of reasonable quality which are created either manually or with the use of basic machines in makeshift sheds.

Commenting on the how Jua Kali has gained momentum in the recent past, Indimuli et al. note:

> *Unable to find meaningful means of livelihood apart from the largely corrupt, incompetent, and ineffectual independent governments, many disappointed and unemployed African people ended up seeking survival in the "jua kali" sector. By the 1970s, the number of Africans in the "jua kali" sector numbered in the millions. Without adequate funds, proper skills, and a suitable labour network, many people joined the "jua kali" sector they had previously ridiculed.*
> (Indimuli et. al., 2017)

The combined worthiness of speed (patrons can put custom orders), price, and reasonable quality ensure consistent demand for Jua Kali products and thus sustain the system. Acknowledging its contribution in supporting uneducated, semi-skilled workers and craft based micro industries, Indimuli et al. (2017) also note:

The reality is that the jua kali industry has become an integral part of the Kenyan economy. It is no longer a marginal activity patronized by the poor and the underclass. It has become fully embraced by every segment of society. Many educated men and women have ventured into it, and there are countless reports of enterprising men and women who have thrived and even become rich in the sector. The society and the economy have benefited from the industry.

The Jua Kali culture is fuelled by the need to survive and represents a brand of defiance against deprivation. However questionable the quality of the resulting goods or services may be, they are ultimately approved by the affiliated social ecosystem, and more importantly, they generate market demand, which significates a respectable endorsement for yet another culture of improvisation that thrives in restrictive circumstances.

Figure 3.07 – Huaqiangbei market in Shenzhen, China, where multinational companies such as ZTE and Huawei started by experimenting with tech components

3.5 **Zizhu Chuangxin (China)**

The improvisation culture of Zizhu Chuangxin in China is in equal parts related and dissimilar to the other cultures from around the world discussed in this section. The first word, Zizhu, denotes self-reliance or self-determined actions, and the second word, Chuangxin, can relate to innovation, or creation of newness. As Shao (2013, p.168-194) explains:

> *The English term innovation does not have a universally-accepted definition. In general, innovation refers to technological advancements in products and processes. While the term self-driven innovation in its Chinese context, too, refers to new inventions in certain industrial and technological areas, it attracts no interpretive difficulty to extend it to cover cultural and creative industries as well. Chuangxin means creating newness, and this may include knowledge creativity as a whole...An even more confusing term is Zizhu itself, which captures the senses of "original," "independent," and "ownership." ..*

> *..Often the term Zizhu is translated as "indigenous" and is confused—in ideological, non-holistic stereotypes—with "self-reliance" (zili gengsheng), a Maoist policy. There is also a rarely-adopted translation: "sovereign innovation".*
> (Shao, 2013)

Consequently, the perception conveyed of the overall culture is that of self-driven ingenuity, a feature it shares with the rest of the others discussed here.

The nationwide scale of practice is another marker by which it can be established as generic, however, its differentiating factor lies in its scope, since it focusses solely on technological breakthroughs, in conformance with state policy (Cunningham and Morris, 2008, p.237).

The effective drive, in this case, is to compete with the proverbial West in churning out the latest and greatest, particularly in the field of consumer electronics, and dominate relevant market segments on a global scale, not only as a manufacturer but also in the role of a determinant. The research considers Zizhu Chuangxin, along with Chindōgu of Japan, integral to the ethos of improvisation. However, their interaction with modern technology, and its affiliated ideologies, make for a perceivable diversification, not in terms of the competency of improvisation to handle the respective challenges, but in the comprehension of 'need'.

3.6 **Inference**
Commonalities in the underlying narrative

"Chance favours the prepared mind"
Louis Pasteur (1854)

Commonalities in the various approaches can be gathered to further the discourse on creativity in restrictive circumstances. If we are to consider the main factors which are responsible for the eventual manifestation, we can clearly see a pattern emerging, in relation to those discussed in the previous chapter. These factors include:

1) Non-negotiable preconditions: In each case, a set of vital preconditions lead to identifying a primary 'need' which is then focussed upon and addressed in accordance with the nature and availability of resources. The preeminent criterion is often always to address the central need without any compromise, and in doing so, most other secondary requisites (such as ornamentation) are ignored, unless they are established as marginally essential, such as in the case of Galimoto where toy designs are elaborated and amended upon in multiple phases of revision. Similarly, in the case of Zizhu Chuangxin, the situation requires constant innovation in consumer products, wherein a certain level of dedication to cosmetic aspects is obligatory, alongside a reasonable understanding of current fads.

2) Receptivity in appraising resources: The respective practitioners are seemingly unbound by conventions of material usage, in pursuit of their intended objectives, and are even accepting of any incidental worthiness which may come their way. The resources available at hand are routinely experimented with alternative interpretations—which at times go beyond their originally intended purpose—through multiple rounds of iteration, till the time a suitable substitute is found that is compliant with a specific purpose or a required attribute.

3) Scale of Practice: Each individual case represents an expression of material culture on a societal level that has lasted over a definite period and is already considered as a legitimate (even if undesired, in some cases) component of the overall culture. These practices, although unique and endorsing certain norms and values which may seem antithetical to the conventions of the societal majority, are still basically intuitive responses to the prevailing environment.

4) Breadth of Impact: Another feature in conjunction to the scale of practice is the size of the audience for the intended solutions which varies significantly, both inter-culturally and intra-culturally. In some cases, the extent of impact is modest, such as Galimoto, where wireframe toys are constructed for individual use. On the other hand, despite bringing a similarly disquisitive approach to product design, Zizhu Chuangxin's derivatives affect a notably broader set of populaces.

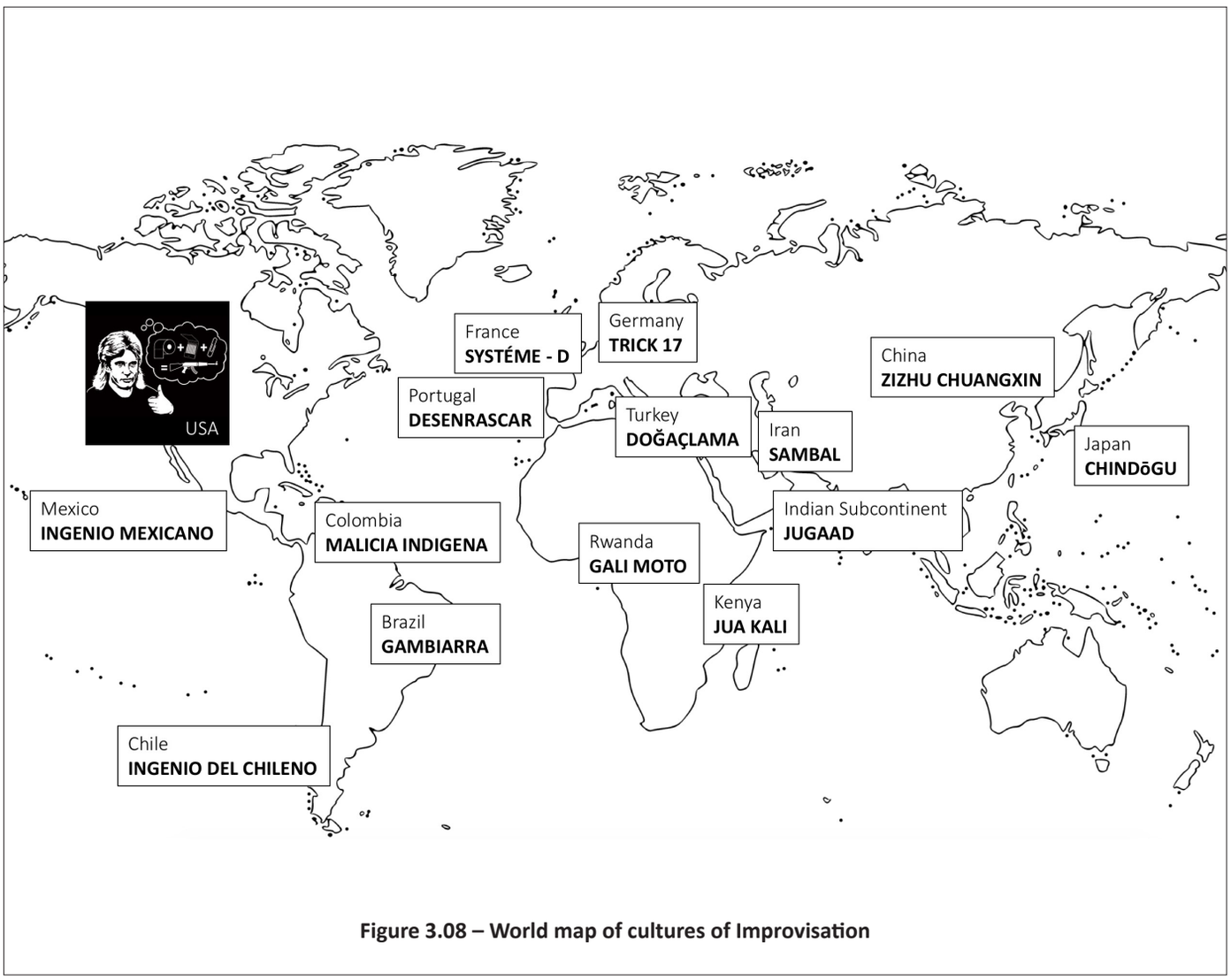


Figure 3.08 – World map of cultures of Improvisation

3.6.1 **Everyday improvisation as a cultural complex**

From the world map of cultures of improvisation, and from the specific examples described above, a question arises on whether everyday improvisation can qualify as a cultural complex, since there is clear evidence of continuity between the individual cultural traits. Cultures of improvisation individually may differ in complexities, however, if perceived as cultural patterns, they provide a clear case of being an interrelated whole.

Bates and Plog (1976) cited in Qingxue (2003, p.22) define culture as "a system of shared beliefs, values, customs, behaviours, and artefacts that the members of a society use to cope with their world and with one another, and that are transmitted from generation to generation through learning," which Qingxue scrutinizes by saying that "the definition includes most of the major aspects of culture on which scholars currently agree: patterns of thought (shared meanings that the members of a society attach to various phenomena, natural and intellectual, including religion and ideologies), patterns of behaviour, artefacts (tools, pottery, houses, machines, works of art), and the culturally transmitted skills and techniques used to make the artefacts."

Accordingly, individual cultures of improvisation can be observed to exhibit certain corresponding aspects, such as: patterns of thought, which are principally predisposed to doing as well as possible in situations of varying restrictions; patterns of behaviour, which perceive the said restrictions as opportunity and not impediment for growth and betterment, and reconnect with the essence of available resources to leverage their value to the concern; the artefacts or end solutions, which exemplify defiance and resourcefulness, and provide working serviceability despite their ephemeral roots; and most importantly, the cultural transmission of generations of related knowledge, through observation and word of mouth, which finally gets perceived as a national or regional trait.

Defining a cultural pattern, Qingxue observes:

> *Cultural values are derived from the larger philosophical issues that are part of culture's social surroundings. Cultural values are transmitted by a variety of sources – family, media, school, church, state, and so on – and therefore tend to be broadly based, enduring, and relatively stable. Most important, as is the case with our beliefs, cultural values guide both perception and communication. That is, our values get translated into action. An understanding of cultural values helps us appreciate the behaviour of other people. Important as cultural beliefs and values are to our world views or ideologies, cultures are extremely complex and consist of numerous interrelated cultural orientations besides beliefs and values, including attitudes, norms, and material aspects. A useful umbrella term which enables us to talk about these orientations collectively rather than separately is cultural patterns, which refer to both the conditions that contribute to the way in which people perceive and think about the world, and the manner in which they live in the world.*
> (Qingxue, 2003)

In light of the above definition for a cultural pattern, it becomes apparent that individual cultures of improvisation such as Desenrascar or Jugaad possess attributes that are mainstream, and which thereby capacitate them to be considered within the context of a cultural identity, rather than a subcultural one.

The corresponding mind-sets and philosophical approaches to problem-solving reflect on the enduring socio-cultural values associated with the phenomenon of improvisation in different cultures, and can thus they can accordingly be considered as a cultural complex. Hence, by the virtue of interrelation with similar cultures from other regions, they cumulatively represent everyday improvisation as a cultural pattern.

Chapter 4

Improvisation in Business and Social Entrepreneurship

Improvisation in Business and Social Enterpreneurship

Theoretically, if the determinants from the previously discussed cases are to be compared in the context of Maslow's hierarchy of needs (1943, p.370-396), then the majority are likely fall in the bottom two levels of (1) Physiology, and (2) Safety, particularly if resource scarcity, either historical or prevailing, is attributed as the primary concern. However, cases like Zizhu Chuangxin (China) and Chindōgu (Japan) are not besieged by lack of resources, and yet essay a heavy-set urge to innovate through improvisation. Zizhu Chuangxin exhibits conditions which are dimensionally complex and tripartite, because: (a) the element of 'need' is driven by a clear and unwavering state mandate to innovate, (b) for the 'wants' of consumers and market forces; (c) as well as a 'want' of the state itself to gain pole position in the global race for innovation. It is difficult to equate the nature of the objectives of Zizhu Chuangxin with those of others such as Jugaad or Jua Kali in the context of Maslow's hierarchy, but if we consider Max-Neef's taxonomy of Human Needs and Human-Scale Development (1991), then all solutions from every culture can be suitably represented by the enlisted fundamental needs such as Subsistence, Protection, Creation, Identity, and Freedom.

Jim Sinur (2010), on the other hand, visualises such extensive innovation through improvisation, specifically within the ambit of entrepreneurial activities as 'Design by Doing'. Sinur, who is attributed to coining the phrase, defines it as "an assemblage of processes that are created as the need arrives," adding that there is "no development lifecycle" and "as an approach, works well in situations of unpredictability". He views design strictly from the standpoint of Business Process Management (BPM) and Business Process Innovation (BPI), but when his definition is placed side by side with Herbert Simon's definition of Design (1969) as "courses of action for changing existing situations into preferred ones", "Design by doing" creates the impression of also being an appropriate aphorism for improvised problem solving. He explicates further on the matter by outlining certain features which are equally admissible:

1) Unpredictability – Sinur's premise rationales design by doing as "an approach that works when the process is not predictable", which theoretically falls in line with spontaneous or situational creativity in restrictive circumstances. Uncertain circumstances promote resorting to processes which are unpredictable since all factors are not governable, and the practitioners rely on a constant dialogue with the applicable environment to understand and execute appropriate responses. In the same vein, whereas the utility of the subsequent outcomes can be envisaged, their exact conformation is left open to interpretation until the process culminates.

2) Absence of development life-cycle - In either avenue, due to the uniqueness and unpredictability of individual situations, practitioners are forced to improvise and elaborate on the go. In doing so, they rely heavily on every minute amount of information or understanding which is generated with each step, and then implement them directly in the corresponding cycle of iteration, or as Sinur puts it, the “process builds itself”.

3) Embedded intelligence - In terms of BPM/BPI, embedded intelligence denotes machine learning, however, in the case of improvised problem-solving, the same can represent the inherent knowledge and experience of the practitioner which comes to fore when tackling situations of uncertainty. For example, a deep-instilled understanding of tacking and jibing can be inferred as the a priori reasoning behind the legendary nautical prowess of Portuguese Desenrascanço sailors.

A comprehension of the purely ad-hoc nature of environments where design by doing as an approach exercises agency ad rem, gives us an opportunity to gain greater visibility into related areas of work where emerging strategies are being employed in response to real-world needs. The dynamic nature of constantly shifting design/economic/socio-political landscapes requires strategies which are flexile enough to manoeuvre deftly through sudden or obdurate encumbrances, in pursuit of addressing constant and complex demands. The objective of the following examples is to provide an overview of state-of-the-art interventions permeating such landscapes, which suppositionally subscribe to the above views in part or whole, but whose objectives are always to address ‘needs’ by overcoming situational exigency.

Figure 4.01 – Millions of children across parts of the developing world do not have regular access to proper footwear

4.1 The Shoe that Grows

The beginnings of the concept of a shoe that is self-adjusting, lay in a curious observation by The Shoe That Grows' founder Kenton Lee during his time residing in Nairobi. He noticed a young girl who had shoes which were abysmally small for her feet (theshoethatgrows.org, n.d.), and may have realised that this was a common phenomenon in Kenya and other developing nations where children (and their parents) from economically weaker sections of society could not regularly afford new shoes as their feet grew. He thus embarked on a quest to design footwear which could "adjust itself - so kids would always have a pair of shoes that fit."

The resultant was a pair of sandals which had a system of adjustable straps that could accommodate growing feet by up to five sizes and thus eliminate the worry for perennial upgrades.

Figure 4.02 – The Shoe that Grows adjusts to fast growing feet with the help of adjustable straps

The development process lasted for five years before the final design was brought into the market. Visuals of the precursors displayed in the website suggest a lengthy phase of prototyping, and convey a sense of dialogue with various materials and techniques. With the basic structure identified, the concept looks promising to tackle further challenges such as perhaps developing a covered shoe which may provide better comfort and safety in colder seasons and harsher climates. In places like Cameroon, Haiti, and Cambodia, where the initiative operates in conjunction with various Non-Profit Organisations on a predominantly donation based model of distribution, the shoes present an array of positive ramifications, including health, for otherwise barefoot children.

Despite belonging to an industry long established as a vital component of Fashion, and which generates billions of dollars worth revenue (Transparencymarketresearch.com, 2016), the initiative starkly distinguishes itself by choosing to address authentic real-world needs rather than wants of vanity. It focuses solely on enhancing the core purpose of wearing a shoe, and as a result, it not only offers genuine enhancement to the field of footwear, but also serves as a critique to the philosophies presently guiding Fashion by questioning its affectation to resource abundance.

Figure 4.03 – Alfredo Moser and his Bottle Lights

4.2 **Moser Bulb**

A bonafide product of Gambiarra, the bottle bulb or 'Moser Bulb' is an invention of Brazilian mechanic Alfredo Moser. He chanced upon the idea when once he and his friends happened to have a discussion on how to refract sunlight for transmitting visible signals during emergencies. Moser subsequently experimented with a variety of materials before finding the perfect alternatives in clear water and bleach (Zobel, 2013).

The process of creating and installing the bottle bulbs is rudimentary, requiring a PET bottle of 1.5 to 2 litres capacity to be filled with water and bleach, for installation on rooftops, and each bottle bulb can provide illumination equivalent of a 55-watt bulb by refracting sunlight (Liter of Light USA, n.d.).

"I didn't make any design drawings," Moser explained, adding that "It's a divine light. God gave the sun to everyone, and light is for everyone. Whoever wants it saves money. You can't get an electric shock from it, and it doesn't cost a penny" (Moser, cited in Zobel, 2013).

Figure 4.04 – Liter of Light implemented in Bangalore, India

Picking on the open source nature of Moser's invention (and intention), the Liter of Light project, which commenced in 2011, has been giving the bottle bulb a global audience. The project describes itself as "global, grassroots movement committed to providing affordable, sustainable solar light to people with limited or no access to electricity" (Liter of Light USA, n.d.) through volunteers who "teach marginalized communities how to use recycled plastic bottles and locally sourced materials to illuminate their homes, businesses, and streets."

The case of the bottle bulb is a particularly effective example to showcase how design, borne out of improvised problem solving can have large scale social impact. The Liter of Light project has installed 350,000 bottles in 15 countries, and is a recipient of the 2015 Zayed Future Energy Prize, and 2014-2015 World Habitat Award (Liter of Light, 2013). Also evident from this case is how need based design is fundamentally inclusive, and more critically, accessible. In consideration of the raw materials required for development—an eventually recycled PET bottle, clear water, bleach, and in most cases, cement for installation— each component is cost effective and readily available. These are distinctive qualities that showcase the magnanimity with which such ideas are conceived, and the ease with which they can be disseminated to, and replicated by prospective beneficiaries on a global scale.

Figure 4.05 – A showcase of different ways of interacting with the Aarambh Help Desk

4.3 **Aarambh Help Desk**

The service and emancipation of women and children from underprivileged sections of the society has been earmarked by Aarambh, a Mumbai based NGO, as their central objective (Aarambh.org, 2012), for the purposes of which they provide a range of skills to the said sections including programs on education, health, and various other vocations. An important area of intervention which they have determined in this regard, and have duly acted upon, is one particular situation of need that affects children of underfunded rural schools in the state of Maharashtra, India. Unlike their counterparts in metropolitan cities and towns, these schools run on shoestring budgets and can only afford to provide the absolute basic in terms of provisions and amenities. Thus, essential infrastructure like chairs and study tables inevitably fall pray to the accompanying measures of austerity, and the students are thus forced to sit on floors while in class. This in turn has been known to lead to bad posture, poor eyesight, and bad handwriting (DDB Worldwide, 2013).

There is also a secondary disadvantage associated with the schooling of children from the economically underprivileged sections in India. Due to the financial constraints of the family, the children aren't always afforded proper schoolbags, and thus typically carry their course books and notebooks in hand or in polythene bags.

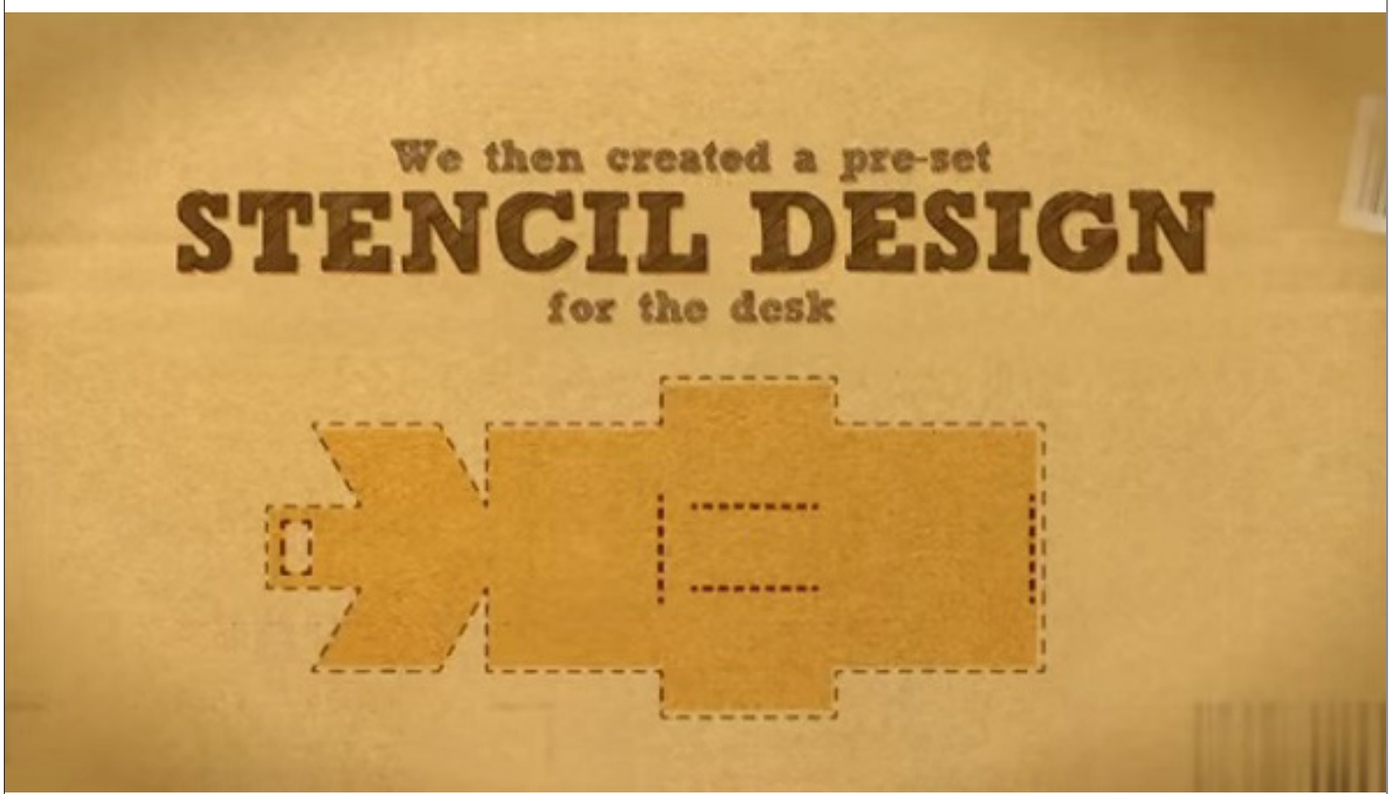


Figure 4.06 – The stencil design has been made available free online for public service

The Aarambh Held Desk is a product design initiative undertaken by the NGO, which helps mitigate these difficult circumstances by proposing a consolidated solution. The Help Desk is made from recycled cardboard, and is an attaché style school bag that doubles up as a writing desk upon making simple folds. It costs less than € 0,20 in manufacturing and assembly. The raw material is acquired from recycling centres, and then laser cut and folded (Mok, 2014) to obtain the intended form. This initiative exemplifies "intelligent action derived from studying how people use their circumstances" (Suchman, 1987, p.50). It works well within its own limitations, and targets only specific areas of a bigger issue, as a means to alleviate predicaments. Such reserved scale of affairs may give an initial impression of inadequacy, but it is demonstrative of a kind of motility from within the society, which is characteristically defiant and is undeterred by discernibly benumbing realities.

If the overall context is considered, however, the underfunded schools whose attendees it services, can also lay claim to signifying such motility. They await and accept incremental improvements such as the Aarambh Help Desk (and the accompanying media and public exposure as a consequence of such initiatives), while spiritedly attempting to address another vital real-world need—education—despite cutting repressions.

4.4 **Slow Fashion Movement**

The Fashion industry is synonymous with constant change. Seasonal trends change preferences for colors, silhouttes, fabric, and more, ushering the rapid pace of garment obsolescence. Over the past two decades, this rate of change in Fashion has only accelerated, due to advances in production technology, larger and more efficient distribution, and the liberalization of economies from around the world, thus shortening the time from concept to store. This speeding up of trends and time is popularly referred to as 'fast fashion' (Fletcher, 2007). The garments now tend to be of lower quality, pre-determined to be worn for a single season.

Based on the principles of Slow Food Movement, Slow fashion is an alternative to mass-produced clothing or Fast Fashion. The term was coined by Kate Fletcher from the Centre for Sustainable Fashion UK in 2007, and its initial intention was to reject all mass produced clothing and promote clothing made by hand. The overall 'Slow' movement commenced with Carlo Petrini's protest against the opening of a McDonalds restaurant in Piazza di Spagna, Rome in 1986 that sparked the creation of the Slow Food Organizaiton (Popham, 2009). Over time this developed into a subculture of Slow Cities, Slow Travel, Slow Living, and subsequently, Slow Fashion.

Fashion stakeholders including brands, manufacturers, designers, makers, fibre farmers, suppliers, retailers and consumers, have an opportunity to partake in the concept, as mutual responsibility and collaboration are considered paramount in Slow Fashion. Other important facets of the phenomenon are as follow:

- *Fast changing fashion trends are rejected and there is more importance given to classic styles that last longer.*
- *Production is on a smaller scale, and distribution chains mostly include local markets and fairs, and value is given to fashion oriented social projects that benefit local communities.*
- *Old garments are recovered or recycled into new garments*
- *There is emphasis on the concept of Fair Trade across functions.*
- *There is moderation in use of colour as it is one of the most polluting areas of the fashion industry especially in relation to water, hence organic clothing generally has a limited array of colours.*
- *Long lasting materials are given preference.*
- *Awareness is spread on consumption habits, particularly among children and youngsters focussing on shopping for quality more than quantity at a lesser price, controlling impulses to consume and building resistance to manipulations.*
- *Less electricity is used through home sewing, air drying instead of using drying machines etc.*

(Dickson, Cataldi and Grover, 2016)

Figure 4.07 – Fashion brands like Tonlé are making dresses out of leftover material cast aside by large manufacturers, and are following a strict zero-waste policy themselves

Having had personal experience in the field of Fashion, one can vouch for the excesses that the industry indulges in, from the point of view of both production (especially in the case of Couture) and consumption (Fast Moving Consumerist Fashion). There exists a bonafide 'need' in terms of a cultural shift like Slow Fashion to help re-orient priorities. For the developed world, dire needs may not exist in fundamental aspects such as clean water, health and sanitation, education., but may exist in reconnecting with material possessions, and creating new more meaningful relationships between producers and the consumers. The corresponding reformative measures suggest an ethos of improvised problem solving, marked by hyper-aware and mindful actions; a careful reflection of the situation and assessment of risks and opportunities; and the leveraging of resources through reinterpretation and reuse.

Figure 4.08 – The Jaipur Foot is a simple, customisable and low cost prosthetic

4.5 **Jaipur Foot**

The 'Jaipur Foot' is an often cited paragon for frugal innovation affecting the lives of millions of individuals. In a nutshell it is an initiative which offers free prosthetic limbs to physically challenged individuals from economically weaker sections of the society. Although its services are mostly India oriented, the Non Profit Organisation responsible for its development and distribution, Bhagwan Mahaveer Viklang Sahayata Samiti (BMVSS), has set up clinics in 26 other countries (Kanani, 2011).

> The original Jaipur foot technology was developed in 1968 by a group of eminent doctors along with a master craftsman named Ramachandra Sharma. When asked to come up with an initial foot design, Sharma created a foot resembling a natural human foot with toes. He opted to use rubber because automobile tires made of rubber were long-lasting and able to take rough roads. Sharma, however, did not know how to use the rubber in a mould. Looking for help, he approached cycle repairer Chugga Bhai who, with his knowledge of vulcanising and repairing old tires, was able to help Sharma cast the first Jaipur foot using natural rubber.
> (Mysore, 2016).

Giving more insights into the structural aspects of the modern version and how it has moved on from its humble beginnings, Mysore (2016) further explains:

Figure 4.09 – The prosthetic has transformed thousands of lives, and is provided free of cost to the extremely poor

> *Today's Jaipur foot uses two blocks of microcellular rubber and an ankle section made of lightweight willow wood; the foot also uses nylon cords, which are embedded in the rubber. Additional rubber is used to cover these units and to provide the final form of a human foot, adding flexibility and shock absorption. The external cover uses a cosmetic rubber cushion compound, which gives the prosthetic the colour and texture of natural skin.*
> (Mysore, 2016)

The Jaipur Foot is of great interest to this research because it embodies qualities such as speed, moderation, adaptability and inclusiveness, and more importantly, marries sentiment with design. It is also interesting to note its recent association with 'Frugal Innovation', and the subsequent acquiring of a 'low cost alternative' tag. The retail price of the Jaipur Foot for the general public is approximately $ 45, where similar offerings from US based competitors can cost up to $ 12,000 (Kanani, 2011).

Since its inception, the initiative has provided approximately 400,000 prosthetic limbs, which is a significant - and significative - statistic, questioning why the comparable but high-priced products: which take years of development; are more dependent on expensive material and technology; require costly medical procedures for assembly; and carry a higher cost of maintenance, do not fall into brackets such 'exorbitant innovation' or acquire labels such as 'overpriced alternatives'.

4.6 **Conclusion**

The discussion hereby arrives to how the above examples are connected with cultures of improvised problem-solving, when most of the cases are clearly products that are seemingly not improvised but conceived out of a definitive plan, and incorporate a circumstantiated phase of research and development. An impression may be conveyed ergo, that these cases fall contrary to the narrative posed in the previous chapters, which promotes versions of hustling as a means to create (and thereby survive). However, all precepts converge principally on multiple counts. When we consider the case of the Jaipur Foot or The Shoe that Grows, we are immediately made aware of dependence on production techniques that are based on a conceivably outlined approach, where as if we compare products that typify Jugaad or Desenrascar, such as the ones depicted in Figures 3.01 or 3.02, we can see that the process is more aleatory.

The obvious commonality between the former and the latter is that both respond and cater to deliverance of needs. The variable factor in this instance is that of Time, or the intended duration of the enterprise. If the need is perennial, like in the case of the Jaipur Foot, a discernibly higher level of sophistication in the product speaks as much of a persistent process of iterative enhancement, as it does of a systematised assurance of resources. Whereas for the Aarambh Help Desk or the Moser bulb, the need is perceptibly mid to short term in anticipation of more desirable conditions, and reflects as such in the choice of materials. However, that does not impede their commitment in any manner towards fulfilling the core need, even if for a comparatively shorter duration, while they await incremental improvements which may subsequently see them evolve into long term prospects such as the Jaipur Foot.

The factor of Time in the case of the Slow Fashion is not as pronounced, and slightly drawn out since it seeks a paradigm shift in ideology, but its relevance is endorsed by the urgency that the movement recognises, creates awareness about, and offers uncomplicated remedies for. In its case, another crucial aspect of convergence dominates the narrative, which is Approach. The underlying process though is inherently agile, incorporating a continuous evidence-based analysis of the functioning of all engaged key elements, which aids in the identification and prioritization of individual scenarios, elements and sub-processes for further improvement.

The approach, and its individual vectors which will be discussed at length in the corresponding section, is a vital cog that draws together the guiding principles of each of the above examples. Within its ambit lies an attitude that entails a ‘come what may’ spirit which may be interpreted in certain situations as defiance, and in others as an intensive desire to know and understand. This places it in contradiction to the officiousness of approaches employed by ‘want’ driven design.

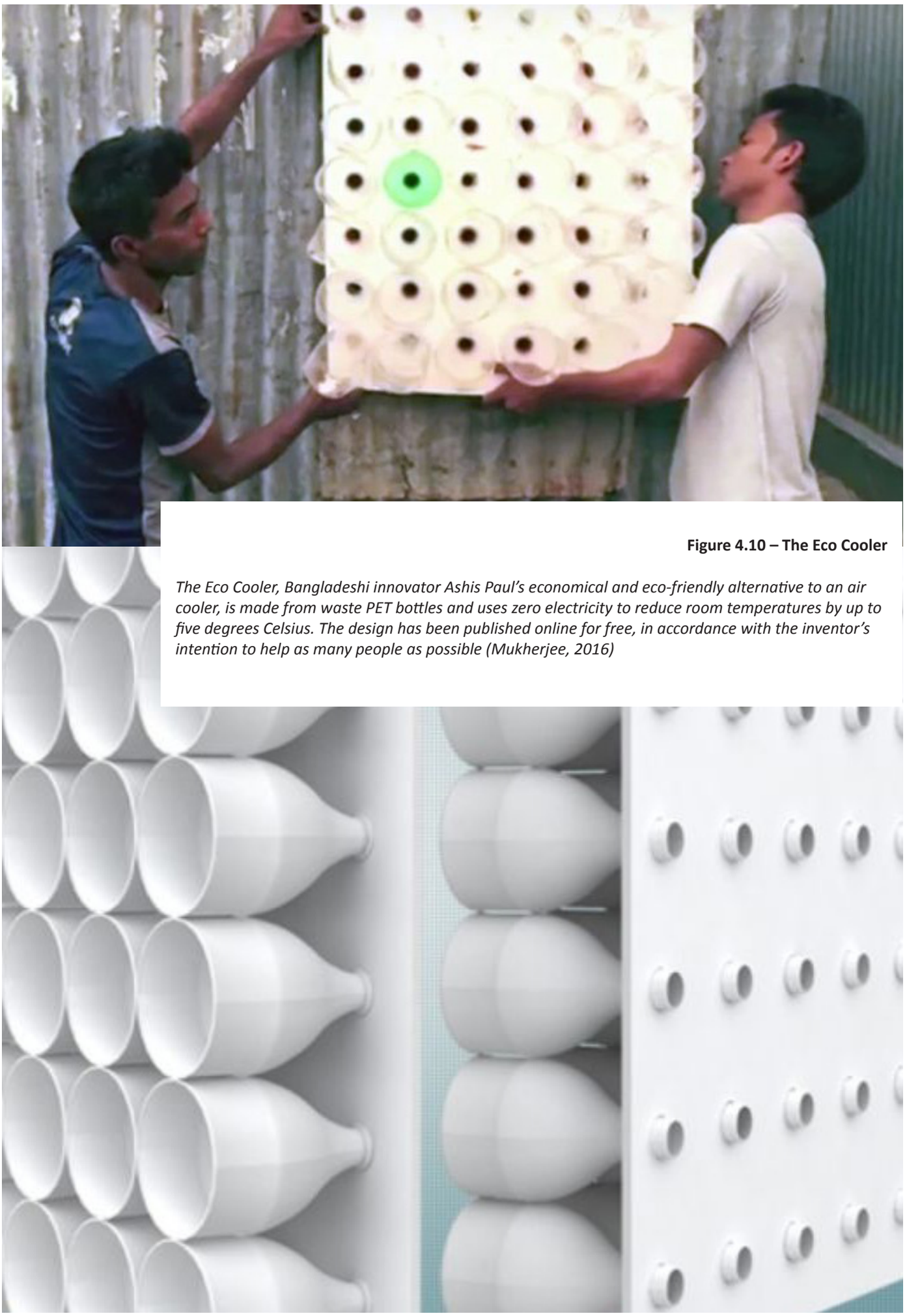


Figure 4.10 – The Eco Cooler

The Eco Cooler, Bangladeshi innovator Ashis Paul's economical and eco-friendly alternative to an air cooler, is made from waste PET bottles and uses zero electricity to reduce room temperatures by up to five degrees Celsius. The design has been published online for free, in accordance with the inventor's intention to help as many people as possible (Mukherjee, 2016)

Section 2

Phono
Tuner
Tuning
PHILIPS
Amplifier
Filter
Volume
Balance
Bass
Treble
Selector
AM
FM
FM Stereo
Phono
Tape
Auxiliar
Tape Deck
Pause
Record
Play
Wind
Rewind
Stop
Counter
Level
Mode
Tape
Left
Right
Recording Adjust
Power
MICRO COMPUTER CONTROLLED DECK

Chapter 5

Elements of Improvisation

Actions involving improvised problem solving, at an elemental level, cannot by structured into a steadfast set of activities. This is in part due to the great disparity of character between the situational constituents such as critical objectives, or nature of available tools and resources, and the fundamentally diverse and inconstant responses of the *in situ* actors. Thus, effectively, a chronological process of improvisation is irrational to construct, however, in order to comprehend its dynamics, it becomes relevant to consider the individual process elements instead, which may help provide a synthesis of the overall phenomenon. Also, by constructing a synthesis that articulates the relevant functions, catalysts, and characteristics of the associated material culture—instead of creating a rigid sequential blueprint of a process—it becomes possible to mould and organise the knowledge proportionately, for adjusting in accordance with specific requirements of the prospective scenarios of implementation.

As with the subject itself, its analysis requires an intuitive process of cognizance, since the respective dynamics can be fluid and inconsistent between examples, in terms of configuration and culture. Thus, in order to digest the vast expanse of related information, it becomes necessary to identify patterns that help explain the phenomenon configurationally. For explaining the concatenations between the different elemental dimensions at play, the thesis determines two main agglomerates, namely, the methodological or process elements, and the elements which comprise the causal nexus for an act of improvisation. Whereas the former agglomerate enlists auxiliary actions as configurational elements, the latter discusses key ingredients which stimulate our embedded predilection to improvise.

Accordingly, the following common vectors or elements of improvisation have been identified:

1) **Acts of Improvisation**: The acts of improvisation are an assortment of procedural elements that identify individual sub-level actions during improvisation in restrictive scenarios. This in turn leads to the identification of a naturally occurring dialogic space between the actor and the situation, which correspondingly directs the discourse towards the enumeration of further configurational elements, such as:

2) **Nature of tools and resources**: A summary is made of the typical characteristics of tools, materials, and other resources that are used by improvisers as agents of adaptation, for combatting situational demands.

3) **Role of critical and creative thinking**: The mental approach to circumstances needing improvisation based interventions is detailed through distilling the manner of convergence between two distinct channels of thought.

4) **Role of stress and survival instincts**: The role of intrinsic human responses is touched upon to understand the how and why improvisation as a creative output is highly basal.

5) **Role of knowledge and intuition**: The types and of embedded knowledge are analysed and their contribution to the creative process discussed.

6) **Characteristics of end solutions**: The final resultants of the improvised creative process are compared to uncover underlying commonalities of the occurring material culture.

5.1 **Acts of Improvisation**

The Acts of improvisation entail a number of sub-level elements or secondary actions, which subtly or forthrightly, play a part in effectuating the discourse between the self and the associated delimits. Due to probability based complications, the process of improvisation is naturally unbound from a strict delineate, however, this thesis identifies the common elements that frequent the broader procedural narrative.

In terms of discernible methodological elements, a broad deconstruction of the approach hints at four diacritic acts amalgamating into an iterative creative process, as a means to counterbalance the inevitably unpredictable complexion of probable outcomes:

1. **Act of Prioritization:** In tandem with various circumstantial paucities, the emphasis moves to identifying and addressing needs on a sequential basis, with immediate and most pressing needs given clear priority over secondary and less significant demands.

2. **Act of Reinterpretation**: The value of resources at hand is determined and subsequently augmented through reinterpretation, either through combining with other resources or by deliberating alternative values (which may or may not be affiliated with the original intentions associated with the resources).

3. **Act of Reorganisation**: Consequently, the inquiry proceeds to the interplay potential between resources, with an aim to identify conducive arrangements for forcing solutions.

4. **Act of Iteration**: Upon the identification of sets of alternative arrangements, a Schumpeterian iterative innovation process commences incorporating a trial and error technique, with a view to gain incremental development and/or basic resource input, along with process knowledge through incessant implementation.

However, unlike Schumpeter's innovation process which "re-conceptualizes an existing system in order to use the resources from which it is built in novel ways" (Galunic and Rodan 1998, p.1193-1201; Abernathy and Clark 1985, p.3-22; Henderson and Clark 1990, p.9; Kogut and Zander 1992, p.383-397; Grant 1996, p.109-122), improvisers effectively use the iterative process to create and a refine single provisional system to arrive at a single "good enough" (Radjou, et al 2012) solution that intends to address a primary need. *Per contra*, the improvisers' iterative process shares certain supposable similarities with Schumpeterian innovation in terms of acknowledging the viability of input resources at hand. Both scenarios share environments which are conducive to radical thinking and accept errata as an integral feature of the learning curve. In addition, the resources and their integrations are considered open, by default, to re-conceptualisation beyond their attached material and theoretical properties (Nelson and Winter 1982, p.114). In either scenario, correspondingly, the existing resources and their "reconfigurations" serve as the sole platform for the generation of innovation (Collis 1994, p.143-152; Galunic and Rodan 1998).

In the following sections, the above-mentioned acts are deconstructed individually to for gaining further insight into their relevance and significance to the overall discourse.

5.1.1 **Act of Prioritization**

Situational exigencies introduce two fundamental stimuli for instigating acts of improvisation, namely, (1) a central need that requires addressing, and (2) constraints of various complexions. The central need characteristically auto-generates a critical act of Prioritisation, which brings focus to the subsequent efforts. Pressfield (2002) in defining his Principle of Priority, states that “one must know the difference between what is important and what is urgent, and must do what is important first.” It is however, unclear from Pressfield’s definition whether there has been a consideration made for disassociating impromptu action from planned action, since in a majority of cases where improvised solutions are key, the line between the urgent and important gets blurred as important issues are routinely urgent, and/or urgent issues are routinely important. Eisenhower (1954) provides more insight into the matter of comparison between important and urgent by observing that “important activities are intended for personal goals, whereas urgent actions that demand immediate attention, concern achieving someone else’s goals.” In improvised actions, as we can gage from the examples provided in the earlier sections, priority can also lie in fulfilling specific objectives, irrespective of whether or not they pertain to self.

Eisenhower’s sequence of priorities places the Important and Urgent on top, above the Important and not Urgent (2), the Not Important but Urgent (3), and lastly, the Not Important and Not Urgent (4). In improvised action, however, while the sequence of priority concurs with the Important and Urgent being foremost, alongside the consideration of certain components as having secondary importance, it is not in a position to comprehend the third and the fourth sequential priorities as integral, since the high impact stakes of every action, and the accompanying state of resource constraints necessitates contribution from each of the components that are found relevant to realise the strategic objectives.

Prioritisation in improvisation thus essentially demarcates the aims which cannot be compromised upon as the first cornerstone of the associated creative process. Certain cases may be considered here, both new and from the ones illustrated earlier, to assess how priorities have been ascertained in restrictive situations.

• The DIY cellphone, which is an open source project initiated by David Mellis of MIT Medialab, in its current form makes and receives phone calls and text messages, stores up to 250 phone numbers and names, shows the time, and includes an alarm clock. The instructions are available online for the general public to access and fabricate their own DIY cell phone. The obvious priority of this project lies in bringing more accessible and affordable mobile connectivity to economically marginalised sections, however with mobile technology and services becoming advancingly cheaper and gaining greater accessibility in some parts of the world than wired telecommunication, a pertinent case can be made for re-interpreting the project priority. Much like constructing model aircrafts, a DIY project like this gives the impression of being geared more towards cultivating and promoting interest, interaction, and exploration with technology at a slightly more advanced—albeit amateur—level, not only from the position of a user, but also from that of an enthusiast. In a world obsessed with acquiring the latest and greatest in consumer-tech on a habitual basis, such interventions hold the capacity to inculcate a better understanding and appreciation of the happenings behind the face of these products, through providing a hands-on introduction to the background science,

materials, and processes required to build the related hardware.

• In the case of the Foxhole radio, the prime priority of the intervention, for all intent and purpose, was to gain tactical advantage in a situation of war, and since it was carried out on-field, the corresponding hostility of the environment as a matter of course became a stimulus for channelling the basic instincts of survival. Therefore, the building of the radio equipment from scrap is a clear manifestation of the impulse to stay alive, binding the intervention's substantive objectives with a subliminal one.

• The Jaipur foot is a prime illustration of how an iterative design process aids in the incremental betterment of an improvised solution without affecting its continuity in any adverse manner. The sole objective of the initiative is to provide either free or low cost prosthetic limbs to the afflicted in the form of communitarian service, and although the older versions of the synthetic limbs have been methodically functional, the Jaipur Foot team has continued to invest in R&D over the years with a view to continually better their offering. At the same time, since one of the original intentions of the service was ultra-affordability, different divisions of the project such as R&D, and Finance (the project relies substantially on donations) have worked in unison towards this common aim, to attain the best price to quality ratio of materials while guaranteeing the structural integrity of the product – and thereby, not compromise on any of its critical objectives.

• The case of the Sarajevo Survival Tools represents yet another setting of war, where the affected civilians have undergone a significant amount of time facing resource disadvantages, and yet have attempted to cope with the situation through building upon hope and resourcefulness. The Survival Tools are thus a manifestation of the same, as illustrated not only by the prima facie evidence of improvised weapons, and handy tools such as torches, but also by the improvised cooking vessels, watering pots, and children's toys. These represent different circumstantial priorities of different individuals during a period of conflict, however when considered together, the emerging common narrative between these priorities is that of human endurance in light of exigencies, and the will to lead as normal a life as possible, despite overwhelming discommodities.

• Correspondingly, a comparative case can be made between the Sarajevo Survival Tools and the Mitticool refrigerator, with respect to their handling of aesthetics. The clear priority of the former is function, as evidenced from a majority of the showcased evidence, and is seen to take precedence over aesthetics, barring a few instances such as children's toys. The objects are utilitarian, and streamlined to provide applicability for specific tasks. There is no apparent thought given to beautifying the objects since that function is contextually non-relevant. On the other hand, despite also being utilitarian, and borne from improvisation, the Mitticool is at the same time a consumer product. Hence it respects the fancy for garniture among its prospective clientele, and accommodates decoration within its core composition of priorities.

5.1.2 **Act of Reinterpretation**

The act of interpretation emphasises the way an improviser visualises the value of the resources at hand. Depending on the level of resourcefulness an improviser can bring to a given scenario, any available resource may carry the following values, and it is the prerogative of the improviser to ascertain and subsequently utilise these to their advantage in solving the complexity(s) at hand.

The first value is the Actual or the originally intended value of the resource. For example, in the case of a pencil being utilised to spool back an audio cassette, the actual value of the pencil is for use as a writing instrument. For the purpose of spooling, this attribute may be found irrelevant, however, in alternative cases, such as in the Foxhole radio where the pencil's sharpened lead acts as a detector, the primary suit of a resource may come to the fore, albeit as a part of singular or uncustomary propositions.

The second rung of value proposition is the perceivable value where in the improviser utilises inherent resourcefulness towards determining not just what an available resource is, but what it can be. In order to accomplish this, the improviser seeks answers in the physical and material characteristics of the resource. The physical characteristics include attributes such as the shape, size, dimension, and texture, and the case of the pencil represents a scenario where this type of perceived value takes precedence over others, since its dimensions are found best suited to fit in, and rotate the reels. The same also holds true for the large cooking vessels (Figure 1.04) whose size and dimensions allow for their usage as floatation devices during floods, and for empty PET bottles, whose structure and volume grant no dearth of ingenious applications, from fuel tanks (Figure 3.01) to light bulbs (Figure 4.03).

The material characteristics of a resource, on the other hand, incorporate the behavioural traits of a resource's primal matter. For example, clay is known to be conducive to evaporative cooling, and this knowledge has been utilized traditionally in making clay pots for storing water, as well as for constructing houses, in part or whole. Mitticool has comprehended this, and has managed to port the underlying concept into making small household refrigerators which cool food items without requiring electricity. Another example which is pertinent in this regard, is the use of rice for drying electronic items, where in the common practice has been to dismantle and leave a doused article¬—ordinarily a mobile phone—in a bag of rice for a period of 2-3 days, in order to sap out all moisture from the device. Thus a natural attribute of a generic resource is used for an atypical purpose. Further material traits include mechanical properties such as hardness or brittleness, malleability, ductility; Electrical properties such as conductivity or resistance; Chemical properties such as reactivity or corrosiveness; and even Environmental properties such as embodied energy or water; among others, all of which hold the potential to benefit the improvisation process in typical and atypical styles, if and when applicable.

A further illustration of such ad-hoc ascertaining of a resource's physical and material values can be derived from the analysis of a preliminary practical exercise conducted with over 700 participants during the course of this thesis, including students and educators from design and engineering, and the general public. A description of this exercise and its results catering specifically to the issue of physicality and materiality of resources is as follows:

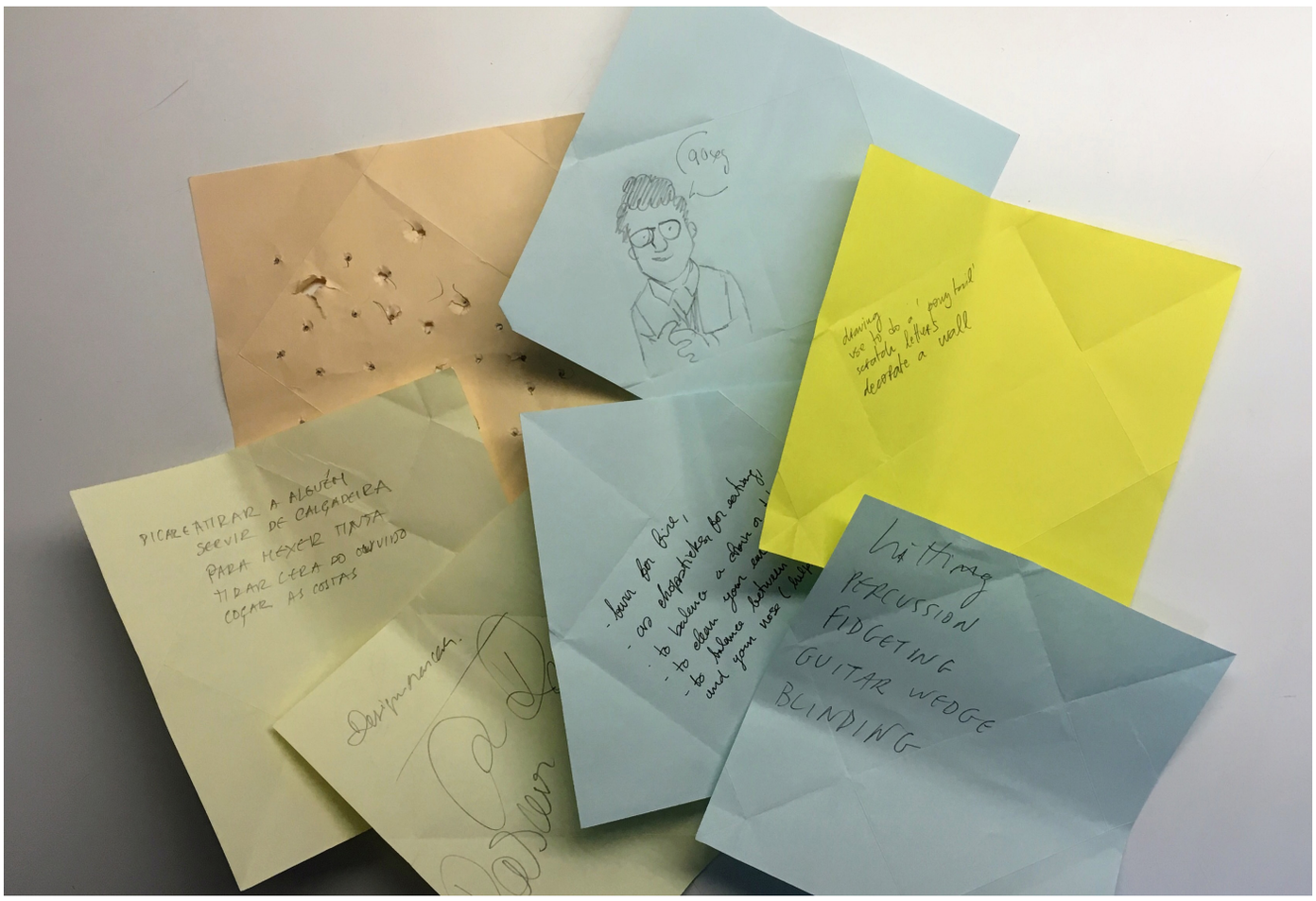


Figure 5.01 – Different approaches in response to the Pencil Exercise

The Pencil Exercise

The main objective of the Pencil Exercise experiment has been to introduce and instigate the essence of improvisation among a given audience, through a short but insightful practical exercise. In most instances, this exercise has preceded a Designrascar workshop or presentation in the form of a proverbial ice-breaker, and has helped orient the respective audiences towards the theme and intent of the project and the related research work. The instructions of the exercise are elementary, and adaptable to any scale of participation. The two-part exercise commences with an initial explanation of the task at hand, which is to consider a pencil, and note down all manners in which the participant has utilised it personally, apart from writing or sketching, within a time restriction of 90 seconds. Upon the completion of this segment, a second segment breaks ground, where in the task shifts to imagining and noting down all possible manners above and beyond the ones which the participant has already mentioned. This segment too lasts for 90 seconds.

The responses attained thus far are naturally varied, and range from abstract (holes punched in the paper) to transcendental (there is no pencil). However, much of the responses do justice to the intention of the initiative, which is to primarily determine the different orders of value an improviser associates with a given resource, when facing a situation of restriction. The experiment introduces certain restrictions within the ambit of the exercise with an aim to incite impulses relating to improvisation. The first among these is the elimination of the obvious services associated with a pencil—writing and sketching—which

helps de-orient the mind from orthodox lines of thought. The second restriction, which is the limitation of time, encourages a fast-paced undertaking of recall and reinterpretation, with an intention to galvanise spontaneity. A well placed incendiary, usually by means of leaving ambiguous allusions relating to a concours during introduction, appeals to the spirit of gamesmanship, in order to extricate more responses. The corresponding results fall in concurrence with the research expectations, since the majority of responses give prominence to the physical and material properties of the resource over abstract or figmental (magic wand) ones. An important detail to note here is that other value systems such as sentimental value or financial value (barter for another object) get comprehensively ignored. A list of the most recurring answers is as follows, giving a useful insight into the variety of physical and material reinterpretations which the participants made on a single object, with the intent to improvise. The list order is sequential as per the number of responses.

Reinterpretation of Physical Attributes (In experience):

- Backscratcher
- Hair stick
- Pointer
- Audio cassette spooler
- Sculpture Instrument
- Play toy
- Support stick for small plants

Reinterpretation of Physical Attributes (Further Possibilities):

- Sharp weapon
- Stirring stick
- Drumming/tapping stick
- Chopstick
- Hitching stick for knotting
- Compressed wood from shavings
- Potpourri and decoration material (from shavings)

Reinterpretation of Material Attributes (In experience):

- Material for miniature sculpture (lead)
- Mulch (from shavings)
- Material for compost

Reinterpretation of Material Attributes (Further Possibilities):

- Firewood
- Tinder (from shavings)
- Eye shadow (from powdered lead)

An interesting aspect of the exercise which has emerged from its overall analysis, is that instances where an image of a pencil was either displayed or projected to the participants, have been found to garner a greater number of responses per participant on average than instances when the communication of instructions was only verbal. The thesis suggests further scientific study and experimentation in this regard.

Figure 5.02 – A sound amplifier for mobile phone built from paper tube and derder

5.1.3 **Act of Reorganisation**

An act of improvisation is predominantly based on an improviser's interaction with multiple resources, including, at times, the surrounding environment itself. A resource's individual physical and material attributes may, in some instances, suffice for a particular task, as for example, the use of rulers to tear paper in straight lines. However, in more complex acts of improvisation, it is commonplace to perceive a higher degree of correspondence between two or more resources. This admixing aids in the melioration of physical and material attributes of the individual resources through their consolidation.

During admixing, the primary prowess of an object is not always guaranteed a central role, and secondary or accessory suites may customarily find more employability if and when combined with other materials and their respective properties. Successful admixing may also depend upon the experience and expertise which an improviser brings to the process, advancing the possibility of making ad-hoc but educated suppositions. However, repetitive, heuristic endeavours may also assist in understanding compatibility between materials.

The following examples present cases where the act of reorganisation portrays a central role in creatively solving situations of need, beset by restrictions. The intent of the improviser here is to remodel instrument functions by either making like for like replacements of components, or seeking analogous utility from alternatives within a singular synthetic arrangement.

Figure 5.03 – A Pressure cooker coffee machine

This image presents an improvised configuration for a coffee machine by a street vendor in India. The hurdles which the vendor faces in putting together a coffee stall are evident—the lack of financial resources being the most definitive one—which forces him to operate on the street, and makes traditional apparatus, requiring electricity and a larger, more stable base, out of reach. The vendor thereby counters the situation through leveraging his limited funds by procuring individual, and seemingly disjointed fittings and instruments, which he then configures to work together for effectively emulating the same functionality of a coffee vending machine. The central setup he ultimately creates, uses a pressure cooker, a pipe, a screw-driver, and a single-burner stove-set, to deliver frothy coffee to a stainless-steel jug, which is then served in small paper cups to customers. This setup ultimately fulfils the intended purpose, and costs cheaper than standard gear to procure and operate. What is noticeable here is the synergy between the different components, which, with the exception of the pipe, are individual gadgets, or pieces of equipment, whose original purpose is to serve as an abettor for a particular purpose, but not necessarily in the form of a spare part within a greater composition. Features of this particular improvisation are primarily an advanced comprehension of the working of a pressure cooker, often gained solely through observation and/or word of mouth, and its potential to deliver a solution beyond its predetermined utility through modification and augmentation by accessorising.

Figure 5.04 –The standard nature of raw materials makes the Moser bulb highly replicable

The Moser Bulb is another example, where assembled standard materials exhibit industrious coaction towards providing a low cost but highly effective solution. As in the case of the pressure cooker coffee machine described above, here too the need is strictly singular, which is to provide illumination during certain hours of the day, when it is customary for the power supply to get disrupted. Since this period falls during daytime, natural sunlight accordingly becomes the go-to resource for lighting, which is then streamed in to indoor spaces by the use of a clear PET bottle, water, and bleach. This ingenious contraption leverages a variety of different physical and material properties between the said resources, again, by visualizing their value beyond traditional ambits and purposes. Thereby, it effectively expands the thresholds of applicable knowledge through making and implementing unconventional associations. Notable aspects of this configuration are the standard nature and affordability of the raw materials, based on which improvised solutions such as these gain greater accessibility and adaptability.

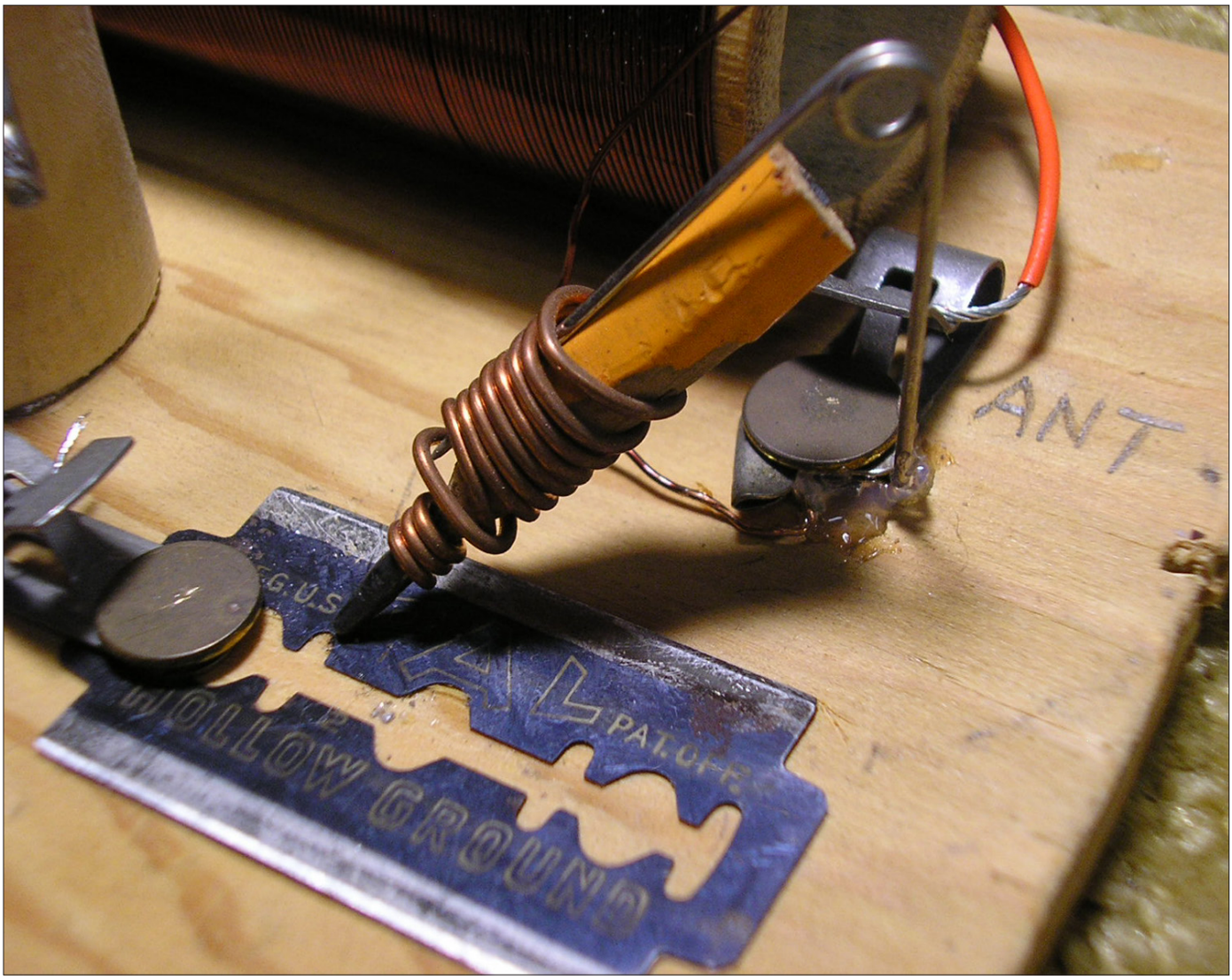


Figure 5.05 – The Foxhole radio unified intent, resourcefulness, and applied knowledge

The configuration of the foxhole radio from seemingly random, but applicable objects reflects upon an essential ingredient of an advantageous improvisation, which is a working knowledge of materials and processes. In this case, it is unfathomable for a soldier without a prior experience and expertise in building crystal radio sets to select relevant materials from the meagre rations at hand, which can then work in conjunction to effectively mimic the interaction between the different material properties of their counterparts in the original setup. This provides further evidence of improvisation being an alternative, and yet commodious channel for knowledge dissemination and application, where in acuteness of the situation coerces a rapid filtering of previously acquired know-how to arrive at the absolutely relevant expertise.

5.1.4 **Act of Iteration**

The Act of Iteration particularizes the repetitive, and fundamentally heuristic process of trial and error, which forms a key aspect of improvised solution-making. This is specifically evident in cases where the improviser is not in possession of all or some relevant expertise for construing a solution, and relies upon an ad-hoc dialogue with the situation, including with the available resources, to gain incremental learning and betterment, in order to navigate towards possibilities. This dialogue is thus marked by as many cycles of implementation as it takes, to arrive at a pertinent resolution.

Within this act, the main aim of the improviser is to seek process and/or material knowledge through direct and constant implementation, in view of the overall objective to fulfil corresponding needs. Depending on the need of situation, and the type of solution being improvised as a consequence, the cycles of iteration may seize as soon as an adequate resolution is reached—such as in the case of the large cooking vessel being utilised as a small boat during floods—or in some other cases, may continue in perpetuity, as a form of fine-tuning, while earlier versions of the adequate solution stay implemented *in situ* (for example, the Jaipur Foot).

The iteration process is highly dependent upon the improviser's assessment of the criteria a prospective solution should fulfil in order to redress the perceived need. This manifests in abstract ideas which then govern the 'Take-the-best' heuristic process (Gigerenzer and Goldstein, 1996, p.650-669) of appraising resources in accordance with the established criteria. In this way, the resources are perceived beyond their preconditioned worth, and experimented with for identifying alternative applicability.

5.2 **Deconstructing the Dialogic Space**

The overall mechanism of improvisation thus, in consideration of each of the above acts as process elements, is observed to be fundamentally dependant on a dialogic space that originates and ensues between an improviser and the situation, as a result of its various demands. This dialogue is understood in the interaction between the improviser, as well as the improviser's mental approach to the problem. Common vectors, in the way of further elements, thereby, manifest in the following dimensions.

5.2.1 **Nature of Tools and Resources**

The resources typically exhibit certain elemental peculiarities which this arising dialogic space attempts to leverage. These peculiarities are specifically noticeable in more complex situations requiring improvisation, however, even in simpler situations, one or more of these characteristics can be observed.

The first of these elemental peculiarities in the nature of the available tools and resources is Heterogeneity. The resources available may appear by origin to be contradistinctive in materiality and in propriety, however, as emphasised earlier, a variegated assortment typically contributes to the overall resourcefulness quotient, and thereby increases the probability of attaining serviceable solutions. Galunic and Rodan (1998) identify the occurrence of the same in industrial and enterprise-based settings, and encourage a further exploration of the embedded knowledge within these resources through "untangling, altering, and integrating with other knowledge bases, towards creating novel business concepts or competencies ". They also concede the radical nature of such reconfiguration which introduces further vigour in determining the relevant value of a resource, even if at the expense of physical remodelling, as against more standard "architectural" innovation strategies which are limited to re-assembly of components and offer no scope of altering their physical state. Within extremely restrictive circumstances which require improvisation—not only during situations such as wars which effectuate responses such as the Sarajevo Survival Tools—but also, for example, in the context of industries which are facing evanescence, the former style of reconfiguration, as means of leveraging the embedded knowledge afforded by the homogeneity, can be considered mainstream and imperative to sustenance.

The second elemental peculiarity which the resources exhibit is that of Abstraction (Louridas, 1999). It takes into account that in individual terms, the resources may lack any direct bearing to the objective, and that it is within the improviser's prerogative to, at first, consider them, and then to extract from, and/or, denote meaning to them. This is done either on an individual basis, or through aggregation with other resources. Such abstraction of individual resources can be seen in the configuring of the Foxhole radio, where specific components are selected from a pool of readily accessible materials—and which exhibit in no manner any direct relation to the end product— are handed meaning because of their perceived inter-compatibility between individual attributes, because their interaction may hold the potential to consummate the central objective.

Lastly, the elemental peculiarity of Pre-constraint considers the nature of individual resources to be finite or 'pre-constrained' (Lévi-Strauss, 1962, p.12) due to the constitution conferred to them for their original utilization. However, through admixing and reinterpretation, the utilities are sought to be accentuated. Lévi-Strauss observes:

> *The possibilities (of individual resources) always remain limited by the particular history of each piece and by those of its features which are already determined by the use for which it was originally intended or the modifications it has undergone for other purposes. The elements which the 'bricoleur' collects and uses are 'pre-constrained' like the constitutive units of myth, the possible combinations of which are restricted by the fact that they are drawn from the language where they already possess a sense which sets a limit on their freedom of manoeuvre.*
> (Lévi-Strauss, 1962)

Thereby, for constituting an effective act of improvisation, the individual experience, knowledge, and awareness of the improvisers plays a critical role, firstly, in acknowledging all relevant pre-constraints, and then towards determining how the material and/or physical limitations can be overcome, either by adaptation or admixing.

5.2.2 **Role of Critical and Creative thinking**

The evidently rapid reasoning process behind an act of improvisation seamlessly binds two distinct aspects which underline an improver's cognitive approach—Critical thought and Creative thought. Maine (2015, p.58-60) elucidates on the same in the context of children's language abilities and visual text, by observing that 'while critical thinking is more convergently focused on solution-finding, creative thinking can be described as a divergent process, for example imagining or making connections, which she describes as 'possibility thinking'. Maine further quotes Bernard, et al. in asserting that "possibility thinking is fundamentally questioning based, and contains pondering and positing 'what if' as a central feature, which correspondingly opens the dialogic space where possibilities are endless and ideas are naturally unbound." This concept of a dialogic space is essentially shared with improvisation, especially in idiomatic terms, since improvisers also rely deeply on communication. However, considering that the communication is with resources and critical restrictions, it differentiates itself by having a different semantic base than spoken or written words.

Further parallels can be drawn from Maine's work on relating critical and creative thinking with convergent and divergent thinking, respectively. Maine validates the interrelation by saying,

> The skills associated with critical thinking can be described as more convergent, leading to solution; for example, reasoning, clarifying, analysing and rationalizing. (…) Creative thinking can be described as a divergent process, for example imagining or making connections.
> (Maine, 2015)

Consonantly, Nickerson (1999, cit. in Maine, 2015) stresses on the interdependence between the two, and observes,

> *Creative thinking is expansive, innovative, inventive, unconstrained thinking. It is associated with exploration and idea generation. It is daring, uninhibited, fanciful, imaginative, free-spirited, unpredictable, revolutionary. Critical thinking is focused, disciplined, logical, constrained thinking. It is down to earth, realistic, practical, staid, dependable, conservative.*
> (Nickerson, 1999)

Hence, either authors, while establishing a clear difference between the two lines of thought, suggest mutual non-exclusivity between the two, since the outcome, as a result of their concerted effort, is the same. This corresponds seamlessly with the process of improvisation, since the minor/major inconveniences and an unfavourable state of wherewithal work to liberate creativity, for example, for making atypical associations and adjustments, and thus can be considered 'Divergent'. At this very juncture, the proverbial field of possibilities is laid bare for unrestrained ideation to take place. The corresponding pool of possibilities is then acted upon by critical or 'Convergent' thought for the purpose of threshing. This includes making a smaller selection of ideas based on their relevance to the need, and upon a critical appraisal of each solution—*in situ*, and however accordant—from the larger pool. This selection is processed, further on, through the cycles of iteration, as discussed before, to eventually arrive at practicable resolutions. In this way, both lines of thought are integral to the process of improvisation, due to their constant background appraisement of prospects and progression.

5.2.3 **Role of Stress and Survival Instincts**

In terms of improvisation, especially relating to actions taken during situations of extreme duress which instigate our fight or flight response, stress is observed to have a positive impact on particular individuals who seem to have the earmarks of being more prepared than others solely within the context of particular scenarios. The research considers them prepared individuals because instead of getting overwhelmed by the demands of the period of duress, they exhibit a natural potential to act in an assured and decisive manner, and utilize the related stress factor to raise their level of performance. However, since stress is a complex and multiform phenomenon, this observation is specific to particular situation-individual dynamics, and it does not automatically imply that the said individuals hold the predilection to act similarly in alternative situations of demand. A report in The Economist weighs in on this aspect of stress by saying,

> *Humans can respond to stress in several different ways. The best-known is the "fight or flight" response, which evolved as a response to sudden danger. The heart rate increases; the veins constrict to limit the bleeding that might follow a brawl and send more blood to the muscles; and the brain focuses on the big picture, with details blurred.*
> (The Economist, 2016)

Within these particular situation-individual dynamics, however, stress plays a crucial role in helping train the focus to the absolute essentials, and thereby acts to eliminate elements which are proven inconsequential to the bearings of the situation in question. The same can be perceived clearly and most often in the field of sports and athletics. As Crum and Crum (2015) observe,

> *…the body's stress response was not designed to kill us. In fact, the evolutionary goal of the stress response was to help boost the body and mind into enhanced functioning, to help us grow and meet the demands we face. When the body encounters stress, it pumps hormones such as adrenaline and dopamine which fuel the brain and body with blood and oxygen, a response which propels the individual into a state of increased energy, heightened alertness, and narrowed focus. Although the stress response can sometimes be detrimental, in many cases, stress hormones actually induce growth and release chemicals into the body that rebuild cells, synthesize proteins and enhance immunity, leaving the body even stronger and healthier than it was before. Researchers call this effect physiological thriving, and any athlete knows its rewards.* (Crum and Crum, 2015)

For improvised solution-making, stress plays a similar role in orienting the mental and physical faculties towards only the most consequential of matters which may require addressing, and/or cannot by compromised on, and blurs out the noise from other, less pressing temporal particularities. It aids not only in the instinctive and rapid identification of the core need, but also in the concurrent processes of planning and implementing an improvised solution, by fast-tracking the recollection of relevant experience and knowledge.

The general perception on stress having a dampening effect on creativity (Epstein, 2000; Rock, 2009), when considered along with the context of creativity discerned from improvised solution-making, opens up the discourse to further interesting conjectures regarding the background neuroscience at play. If "constraints are indeed detrimental to creative expression" (Epstein, 2000), then it begs the question whether Bricolage can any longer be considered an art form, or whether, for example, the invention and innovation of tools and weaponry over the ages—often nurtured by need and/or contingencies, and having roots in improvisation—can also be considered within the realms of creativity since it too requires imagination and practice, and is considerably "original and adaptive" (Simonton, 1999) .

Mednick (1962, p.220-232) defines of creativity as "…the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. The more mutually remote the elements of the new combination, the more creative the process or solution." This definition can be observed to fall in line with certain process elements of improvisation discussed in this thesis, such as the acts of reinterpretation and reorganization, and thus may validate the claim for improvisation to be considered inherently creative, and based out of survival instincts.

A case can thus be made, as one of the paramount suggestions of this thesis, for neuroscience to inspect this aspect of creativity deeper, in order to ascertain whether this type of creativity stems from the same areas of the brain commonly associated with creative output, or whether an alternative hypothesis is

possible regarding a parallel mode of creativity which is also spontaneous, and stems from entirely different sections. Limb and Braun (2008), studying spontaneity in the creative production of music—in this case, improvised jazz—mark,

> *Creativity is a quintessential feature of human behavior, but the neural substrates that give rise to it remain largely unidentified. Spontaneous artistic creativity is often considered one of the most mysterious forms of creative behavior, frequently described as occurring in an altered state of mind beyond conscious awareness or control while its neurophysiological basis remains obscure.*
> (Limb & Braun, 2008)

Limb and Braun's study on improvised jazz thus proves that "innovative, internally motivated production of novel material occurs outside of conscious awareness and beyond volitional control", and suggests a multi-rooted nature of creative production, improvised or otherwise. Catmull (2013) accordingly observes, "People will be most open to creativity when they work in an environment where they know its ok to make mistakes", and that "everyone has the potential to be creative, however, it is our choices which enable or block that creativity". This can explain two additional cognitive facets of improvised creative production, the first of which is the loss of inhibition or fear, that is prominently noticeable in the examples of improvised solutions in dire circumstances, where creativity also gets liberated because of the related dire rock-bottom environments, which present a morbidly alternative situation of 'knowing it is ok to do mistakes.'

Secondly, the issue of choices may explain why and how certain individuals appear more accepting and adjusting to situations which demand or allow improvised creative production. Pond (2012) weighs in on this aspect by noting that "highly skilled improvisation happens when there is a lack of planning and judging." Judging here should not be confused with the constant analysis of the process and related elements that the improvisers engage in during an act of improvisation, since Pond's analogy speaks of a stage before commencement, when prospective improvisers may find themselves overwhelmed by situational demands and beset with related inhibitions. However, based on the gravity of the situation and the level of equanimity of the improviser, the notion of 'nothing to lose, only to gain' may precede, releasing self-doubts and inhibitions, and promoting creative output.

5.2.4 **Role of Knowledge and Intuition**

Acts of improvisation may represent a direct manifestation of different types of embedded knowledge, including codified and non-codified knowledge, which may then inform a heavily instinctive tacit knowledge base (Polanyi, 2002). Since such knowledge is unique, it has a definitive bearing on the eventual resultant, thereby becoming another factor that contributes to the individualistic nature of the solution, in addition to others such as particularities of the situation, reasoning of the problem, and the exclusive and heterogeneous character of the available resources.

Codified knowledge, or "knowing that" (Ryle, 1949), may represent all formal learnings of the improviser that are acquired through reading and/or processing of theoretical information from secondary sources, corresponding to knowledge gained from journals, books and textbooks, lectures, different forms of printed and electronic media, among others. Bradley (2012) reasons codified or theoretical knowledge as one that sets a wider context. He explains it by saying,

> *Theoretical Knowledge teaches the why. It helps you understand why one technique works where another fails. It shows you the whole forest, builds the context, and helps you set strategy. Where self education is concerned theory prepares you to set a direction for your future education. Theory teaches you through the experience of others.*
> (Bradley, 2012)

Improvisers stand to benefit from codified knowledge, especially if within their area of expertise, since it helps augment their practical knowledge and individual awareness. In certain scenarios of improvisation, however, such as ones involving kludging, codified knowledge (not to be confused with coding) can be observed to supersede non-codified knowledge by the virtue of operating in a setting where a wider gamut of formal understanding prevails.

On the other hand, non-codified knowledge, or "knowing how" (Ryle, 1949), is gained mostly through hands-on experiences of the improviser, either directly in-field, or from practice-based simulations, and is typically a more targeted effort. In a real-world setting, the primary gain of these efforts is functional, and the required understanding is obtained through practice and iteration. Bradley sees such practical knowledge as something that "helps acquire specific techniques which become then become tools of the trade."

In making a comparison between practical/non-codified knowledge and theoretical/codified knowledge, Bradley points out that while "theory is often taught in the ideal of a vacuum, the practical is learned through the reality of life." However, the continuity that the improvisers establish between codified and non-codified knowledge can only be considered inspired from intuition or personal insights. This is because a common ground based on relevance is ascertained instinctively by the improvisers between the two distinct types of knowledge, despite the possibility that these relevant bits of knowledge may have originally adhered to separate contexts, and may belong to different timeframes of the improvisers' life.

Tacit knowledge represents such intuitive awareness—with which an improviser reacts to a certain situation—that is acquired and deployed consciously, both in theoretical and practical terms; but also subliminally. Due to this latter cerebral aspect, a standard "prescriptive" (Polanyi, 2002) summary cannot be claimed for detailing the exact employed methods or methodology. The corresponding articulation of the creative process, thus, is natively subjective, and can only be comprehended through a multitude of reflections that are also subjective, but in conjunction can provide a multi-perspective sense of the occurrence, including an appreciation of the different elements at play.

5.2.5 **Characteristics of End Solutions**

The end-solutions of acts of improvisation vary in accordance with the type of improvisation employed, but from this aspect too, certain concatenations can be derived. The commonalities that can be identified, potentially provide an understanding of the context of their existence up front, and reveal the dialogic process which their maker has engaged in for their development. They are products of circumstances and they project the same without inhibition.

The commonalities between different solutions of improvisation commence with the nature of the intended purpose. Their motive is singular, which is to say that the improvisers focus their efforts on correcting a specific problem, or addressing a core issue, and generally there are no affordances made for any sort of compromise. This is because once the core objective gets compromised, the entire process tends to repeat itself, enveloping this instance of failure within the curve of learning, and further efforts are made to identify and experiment with more suitable components until a properly workable alternative is reached.

The next commonality can be termed as Para-Conventionality, in describing the aesthetic elements of the nature of improvised solutions. Since the circumstances, as stated earlier, play a major role in determining the end-forms, there can be no guarantees placed on attaining conventional aesthetics associated with the typology of the solution. The only governing force in this case is the compulsion to address an issue without compromise, or to attain a required function, and aesthetic features are taken into consideration only in cases where they are strictly irreplaceable, such as in the case of the Mitticool refrigerator. In most other circumstances, cosmetic enhancements are seen as an expendable exercise, being either irrelevant or counterproductive to the fulfilment of the core need.

The third commonality can be determined from the relation of the improvised solutions with time. The lifespan of an improvised solution is strictly determined by the corresponding need it services, and thus, it may range from short, one-time solutions to indefinite and/or continuously evolving ones, based on the improviser's appraisal of it's serviceability to the purpose. The inherent flexibility of the process elements also allows for a transition of former cases into latter, if the need proves to be persistent and/or large-scale. For example, the Jaipur Foot or the Moser bulb may have started out as a solution catering to a single instance or a person, however, they have been adapted over time, to attain a much larger radius of impact.

The above discussed commonalities by no means populate every instance of population, however, they do appear individually or in groups. These characteristics make the corresponding products differ in their approach to service, vis-à-vis products of a pre-planned design process. Service is central to an improvised products' existence, irrespective of the level of its marketability, and this is one of the foremost reasons that these products are often either free, or low-cost, and are typically obtainable, or practicable if replicated. In scenarios where these solutions are traded commercially, for example, The Shoe that Grows, the degrees of difference between the actual value, and the perceived value is thereby minimal. The respective creative culture ensures an automatic elimination of strategies such as planned obsolescence.

5.3 **Conclusion**

The enumerated elements of improvisation are thus the components of the related creative process which this research establishes as prolific, however, their concurrence varies depending on the situation. The constant that emerges in this case is the dialogic nature of the creative process, from its inception to end. This dialogue occurs as much with the self, as with the surroundings, and is an effective tool for a number of reasons.

Firstly, dialogue is a tool for **Comprehension**. The first step before exchanging pleasantries with a situation of uncertainty is to comprehend it as ripe for improvisation, whereby an alternative mindset takes effect. Dialogue then continues with the process of acclimatisation in the form of a **Diagnostic** tool, which establishes the specifics of the circumstance, including what is the core objective, and what is the scope of the resource situation for actualizing deliverance. Alongside, a parallel dialogue occurs with the self, which brings any relevant knowledge gained from past experiences into the communication. If the resources are deemed sufficient, the dialogue advances to **Analysing** and ascertaining their value propositions towards a potential solution, whose functionality is already recognised, but whose form remains obscure. The dialogic process accordingly shifts to **Assessing** the subsequent attempts at figuration, until a functional alternative is reached.

The identified elements of improvisation thus help break down the creative process of improvisation into smaller segments. Each of these constituents can similarly be broken into additional constituents for further dissemination of the topic, however, since the research is geared towards constructing a practicable model of creative engagement, it considers the identified elements as competent enough to create a framework around.

Furthermore, the research, through the identification of the said elements, speculates on creativity that results from adverse circumstances as being a fundamentally dissimilar creative process from traditional notions. This is because although the aspects of creativity and ingenuity in the production of the solutions are irrefutable, elementally, the catalysts such as stress and intuition subjectively have a different mental provenience. The dissimilarity is also evident in the outcomes, where conventional functionality takes precedence over conventional aesthetics. A clear corroboration of this hypothesis can only emerge from a neuro-scientific study into the matter, through determining whether the same areas of the brain get activated during improvised creative production as conventional artistry, or whether such alternative style of creativity actually roots from completely different sections. As already discussed, similar studies have been attempted in the past regarding jazz music, however it would be more interesting for this research to pitch more explicit varieties of improvised creativity for testing.

Section 3

Chapter 6

Designrascar

For improvisers, success may not depend as much upon the actual quantity of knowledge, but on its relevance to the given scenario, and more importantly, the manner in which it is exercised. Schmidt and Boshuizen (1993, p.338-351) reason a “considerable experience in rapid, efficient, and effective use of knowledge” as a cornerstone for an implicit organisation of knowledge, which, in the event of palpable circumstances, can be deployed nimbly, and with a certain amount of dexterity.

Designrascar seeks to synthesises this learning within a customised approach to design and creativity. This approach requires a people-centric outlook on the part of the practitioners since its critical concern is to cater to needs, specifically to essential needs that are individual or general in nature, in contrast to inessential wants. Deriving its etymology from the word for Portuguese culture of improvisation, ‘Desenrascar’, Designrascar identifies itself as a course of action that communicates the inherent positives residing within the overall ethos of improvisation. It attempts to achieve this through its pursuit of simplicity in thought and action, dedication to low-tech explanations, and by aspiring for greater accessibility and adaptability of its solutions. The approach differs in philosophy from Frugal Innovation since it does not limit its ambit of applicability to a specific field such as technology, or manufacturing. It acknowledges the multi-dimensional and fluid nature of adversity, and proposes reformative actions that are determined, and yet versatile enough to handle its fluctuating complexities.

The Designrascar approach has been tested for compliance and applicability in a variety of real-world situations, however, this research places Designrascar’s absolute potential as an agent of change for creative engagement, in the field of design education. It is because firstly, the research finds a stable platform to introduce the related theories into simulation-based practice, within a controlled environment. This has contributed towards the fine-tuning of individual aspects of the approach, specifically in areas catering to time management. In this way the research uniquely gains from the very theory of incremental

learning it endorses, and thereby becomes its primary benefactor. Secondly, the research solicits valuable academic validity by collaborating with established educators, and design students from three academic levels (Bachelors, Masters, PhD). Thirdly, and perhaps most importantly, in conjunction with its central objectives, the research recognizes the participating students as future or present designers who can actually employ and relay the best practices of Designrascar through their respective bodies of work.

The Designrascar approach¬—or simply Designrascar—has been trialled accordingly, in academic settings through simulation-based workshops and classroom exercises. These interventions, as iterated earlier, have been conducted as auxiliary projects with professors of design and/or design related subjects, in the faculties of Fine Art and Engineering, at the University of Porto, Portugal. Both the exercises and the workshops are meant to create a shift in the creative engagement and creative outlook of the participants. The simulations have thus been designed in a way that the participants are required to comprehend, at first, the situational conflict arising from the entailing dynamics between compulsions and constraints, and then initiate their natural response to improvise, towards proposing relevant solutions through means of atypical creative production. These Designrascar initiatives have been thematically reconditioned to accommodate a range of contextual settings, from food to footwear. The core concept can potentially be replicated in further fields, if the following criteria are maintained:

- The project must identify a central objective(s) that has to be fulfilled unconditionally, and which may carry a social/cultural/socio-economic relevance.

- The project must introduce (or identify) critical restrictions or constraints that can help focus efforts and instil the urge to improvise, among participants. In the case of the conducted exercises, for example, the restrictions are mostly concerned with the allotted time and/or material usage.

- The focus should be tuned towards the creative leveraging of materials and resources that are either standard, or available at hand.

- Correspondingly, efforts towards making uncommon associations and unconventional creative production should be encouraged, if they solve the intended purpose.

Designrascar in non-academic real world settings has also gained immensely from its academic pursuits, primarily by being able to comprehend its own clauses, and what it essentially stands for. This in turn makes the process of identifying prospective situations easier.
In socio-economically or culturally restrictive scenarios, Designrascar operates by arriving at ‘good enough’ solutions. These typically do not compromise on addressing a specific need, are affordable, and primed for large-scale distribution. Designrascar as a philosophy weaves resource efficacy into its constituitive framework, and as a result operating costs are kept at essential minimums. Other effective habits of Designrascar as a strategy to counter uncertain situations are:

- **Situational Awareness**: The intention is to inculcate a habit of questioning and challenging quotidian elements and taking prompt action on drawn inferences and convictions.

- **Agility and Spontaneity**: The experiential nature of the strategy demands a flexible mindset, which ensures adapting to learnings through trial and re-trial of ideas, till a suitably optimized solution is

reached. In the absence of a protracted phase of research and development, agility of thought is a considerable asset in expediting resolutions.

• **Simplicity**: The approach seeks to be simple and focused, through disqualifying complex and irrelevant features and components, which in turn has a positive effect on the availability and affordability factors of end products.

• **Inclusiveness and Accessibility**: Designrascar as a design strategy is inspired by the people, and it constantly seeks avenues of learning and reciprocation. If it succeeds in proposing solutions that are simultaneously relevant, affordable, accessible, customizable and sustainable, then more markets and economies become serviceable, and not just the ones which are cost conscious and/or eco-aware. The acute intention in this case is to have socio-cultural or socio-economic relevance of action.

• **Portability**: The approach has a clear purpose of being optimally suited to any situation of restriction that requires improvised problem-solving, irrespective of context or scale.

As indicated previously, Designrascar perceives the creativity associated with the dextrous manoeuvring of complexities in a restrictive situation as a direct manifestation of the human zeal to persevere. The leveraging of resources is thus a central particularity of this approach because it positions the research and its resultant philosophy as future-centric. Koerbes (2016) contemplates “today’s waste as tomorrow’s resource”, a view which the research endorses, and considers highly realizable, in cognizance of design’s untenable relationship with production and material culture. While rethinking business and manufacturing for environment and resource constraints may yet prove to be the pertinent way forward, in view of this research, design may find now an opportune moment to heed Koerbes’s estimation, and prepare future practitioners, in advance, for new rules and landscapes of creative engagement.

This section is dedicated to explaining each initiative undertaken by the research during its course, both in academic and non-academic real world settings. Except in the case of the commencing chapter on the Utopian Meal Plan (UMP), which was undertaken in the early stages of the research and proved to be a genuine catalyst, each initiative has been set in motion under the theme and banner of Designrascar. This section demonstrates how the research evolved through benefitting from some of its own theories, by putting abstractions and contemplations regarding the hypothesis in motion, inside classrooms and outside, with a view to improvise along the way, and gain both procedural knowledge, and incremental improvements in research techniques while operating in situations of uncertainty.

The implementation stage concludes with a collaborative research initiative, which the research co-instituted, that validates Designrascar as a method for helping combat situations of constraint. Since the setting in this case is industrial, it has dual implications for the research. Firstly, it proves to be a pertinent arena for the execution of Designrascar’s methods, and secondly, it comes across as a natural extension of the classroom activities, because it exemplifies the typical kind of creative environment which the student participants might encounter, and be required to address in their future endeavours.

Figure 6.01 – On average a complete meal had a cost € 0,85 per head

6.1 **Utopian Meal Plan**

The Utopian Meal Plan (UMP) is an experimental low budget community cooking project which was initiated in UPTEC PINC, Porto, during the initial stages of this research in 2014, in conjunction with colleagues of the PhD Design Program. In terms of the research, it can be considered as an important precursor to Designrascar projects since it shares certain fundamental attributes with the latter, however, in an alternative field—food. UMP, just as Designrascar, it borne out of a situation of need, which it aims to address through identifying specifics; assessing and leveraging available resources; inculcating adaptability; and improvising, wherever necessary, without compromising on proper nutrition, health and safety. The project at present informs the PhD research work of Cecilia Carvalho, International Doctoral Program in Design, Faculty of Fine Arts, University of Porto.

6.1.1 **The Origins of UMP**

The culinary culture of Porto, the second largest urbanity in Portugal, is richly diverse, albeit understated, and with a history to match. A great width and depth in choices emerges from the eclectic mix of traditional continental cuisine with piquant influences from a smattering of erstwhile Portuguese colonies spread across three continents. In a rapidly globalizing climate, Portuguese gastronomy can be counted as among the few thriving vestiges of a bejewelled Europe of yore.

It is thus undeniably unfair to be living and working in Porto under a cloud of financial uncertainty, as the project members were experiencing at the time - especially in light of their subservience to Portuguese gastronomy.

The Utopian Meal Plan emerged from an animated discussion, amidst rising tensions regarding an unprecedented situation of undesirability - to make a choice between saving money and eating well. What if – it was argued - that designerly ways (Cross, 2010) could be used to mastermind a prospect of having the best possible food within the least arduous budget? What if a budget could be set in the proximity of € 1,5, and the members could pool in their resources and efforts to afford a meal that could considerably be qualitatively and quantitatively complete?

Within an hour's discourse, and armed with a rudimentary plan of action, the members embarked upon an impetuous journey towards Do-It-Together gastronomic utopia. The idea was seemingly so farfetched that it decided to name the experiment thereby as 'Utopian' Meal Plan. In retrospection, the urgency with which the members approached both planning and implementation, provided the initial impetus which is often required to radically transform ideas into swift action, when confronting a drastic situation.

6.1.2 **Rapid Planning**

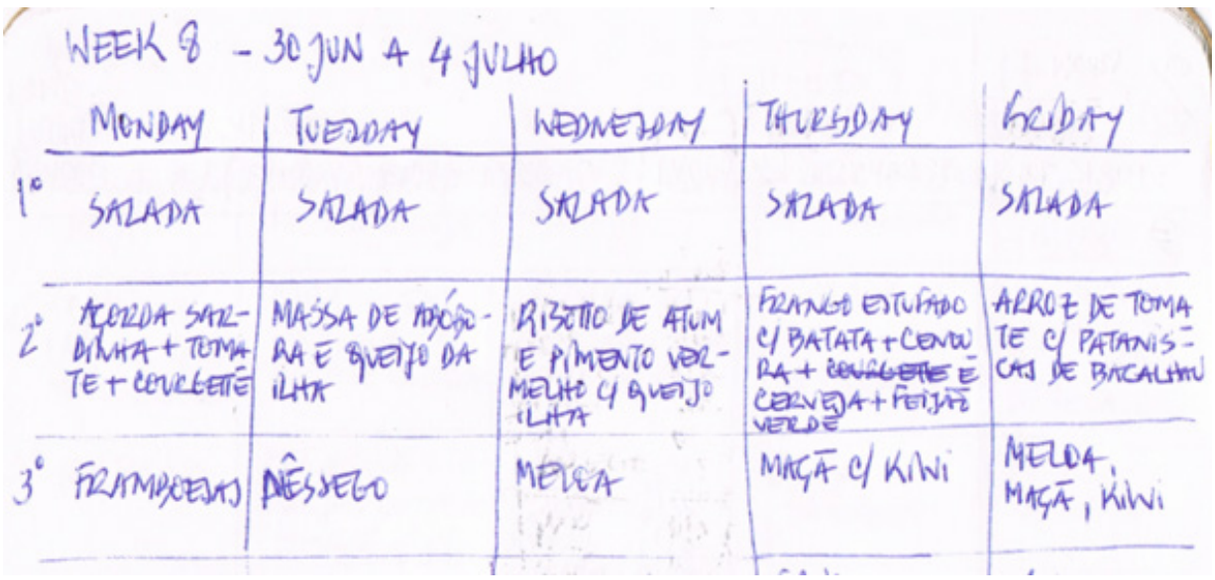
The foremost priority was to agree on two essential components of the project; a workable budget, and the definition of a 'complete meal'. To decide the former, the cheapest alternatives available were considered as a starting locus. A typical lunch served in adjoining restaurants, containing a soup, a main-course dish and desert, would cost between €3 to € 5, and although the servings could be considered as a template, the prices fell well beyond the meagre means of the team. The university canteen, also situated in proximity, provided meals at a tantalizing cost of € 2,45 to students, but we were still ETA of reparation was yet unknown, and thus it was thought best to aim lower. In contingency thus, a figure of € 1,5 per person per meal was arrived upon, with a practicality review planned for the end of the week.

One aspect of dining on a cheap budget is the compromise which is often made in terms of eating healthy. TV dinners and regular fast food may cost lesser than conventional meals served in restaurants, however, they are known to be notoriously high in calories, preservatives and saturated fats, and thus are inconceivable as an overall nutritionally viable food option. If indeed the team was to operate under a strict

Figure 6.02 – All cutlery and utensils were either pooled-in or donated

budget, and at the same time be able to regulate the nutritional parameters of our diet, they would have to consider preparing the meals themselves.

Thus, the resources at hand were taken into account, to do a quick feasibility check on this front. A garden pavilion which was a part of the building where the PhD in Design Program was situated, and where co-workers generally took their lunch in, could offer the space for the project. It housed a microwave, a small refrigerator and a wash basin, along with tables and chairs, all of which were accessible. Additionally, utensils, cutlery and a small stove were to be arranged.



WEEK 8 - 30 JUN A 4 JULHO

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1º	SALADA	SALADA	SALADA	SALADA	SALADA
2º	ACORDA SARDINHA + TOMATE + COURGETTE	MASSA DE ROÇÃO - RA E QUEIJO DA ILHA	RISOTTO DE ATUM E PIMENTO VERMELHO C/ QUEIJO ILHA	FRANGO ESTUFADO C/ BATATA + CENOURA + COURGETTE E CERVEJA + FEIJÃO VERDE	ARROZ DE TOMATE C/ PATANISCAS DE BACALHAU
3º	FRUTOS VERMELHOS	PÊSSEGO	MELÃO	MAÇÃ C/ KIWI	MELÃO, MAÇÃ, KIWI

Figure 6.03 – A weekly menu

The next step was to deconstruct the diet. In order to attain success in the quest for a healthy meal, the essential groups of nutrients were enumerated to target, i.e., Proteins, Carbohydrates, Vitamins and Fibre. Each of these subsequently became the basis for further enumeration of ingredients from which one or more could be derived. Upon arriving at the list of ingredients, it was relatively undemanding to chart out a diet plan for the week (Monday to Friday), covering different starting salads, main course dish, and deserts for each day, and containing of course, all essential nutrients.

Figure 6.04 – Guests were mandatory at all lunches

6.1.3 **The Conviviality Aspect**

A major focus of consideration for the team, with regard to the activities in the aforementioned space, was the inconvenience which might be caused to regulars during lunch hours. The choices were to either choose a different hour, or to cook outside, or to deliberate a way of involving the inconvenienced in the project itself, so that the interfering intervention was not reflected upon in bad light. In the newfound spirit of adventure, the latter was chosen, and the team came to the conclusion that by inviting the co-workers as ‘guests’, one person a day, it would not only help in pushing the challenge further with regard to the decided budget, but could also create an opportunity to meet with a new person every day, share work and life experiences, and perhaps by the end of the week, build an atmosphere of conviviality during the lunch hour, which presently was more of an individual affair.

6.1.4 **A Designedly Approach**

Two basic competencies of design practice, considered of utmost importance, specifically in the field of design for positive social change, which were brought into the intervention are—Critical Thinking, and Swift Action. The express planning process as an example of critical thinking lies in direct contrast to protracted - though percase more detailed - phases of planning, which in situations of urgency can prove to be counter-productive. Subsequent prompt action focuses primarily on addressing the pressing need, and looks to attain incremental improvement alongside, through observant tentation. The agility and flexibility of thought and action allows for rapid progress, and in cases such as the Utopian Meal Plan, produces astonishing outcomes, as is presented below.

6.1.5 **Procurement and Swift Implementation**

A selection of ingredients was identified with which it could be possible to prepare a variety of different meal options, both traditional Portuguese and otherwise. Each of the team members had a number of local shops and supermarkets on the way of their daily commute to the design studio, and it was just a matter of conducting a quick reconnaissance and/or comparing notes to determine the best price/quality factor for each ingredient. Accordingly, a majority of ingredients were procured within the very day, on approximation to last the duration of a week, and only perishable commodities were left to be procured on the scheduled day of use.

A small gas stove, a collection of orphan tableware and a few pots and pans were ultimately arranged, some from own homes and others donated by friends and family, upon hearing the related quixotic plans. The project was launched with minimal misgivings the very next day.

UMP eventually exceeded the modest expectations of the members, and although it may have resulted from a situation of genuine bother, the team persisted with the project even after the end of financial trepidation, and were able to make significant improvements to the overall structure without compromising on the original principles.

The UMP team of 5 members, in the first phase of intervention, managed to conduct 52 lunch sessions spread across 11 weeks, between April ‘14 to August ‘14. There were a total of 233 individual meals served, with 67 of them for guests. The total cost of all meals came to € 187, at the rate of € 0,80 per individual serving, a far cry from the € 1,50 which was originally estimated.

As design researchers, the team naturally employed critical observation for identifying areas of incremental improvement, a good illustration of which is the fact that they were able to reduce the base price of a meal from € 1,50 to € 1,20, and eventually all the way down to €1,00. Other keen observations were also made regarding certain emerging positives from the project, beyond just the context of saving.

The meals worked out to be healthy. The meals were designed and prepared to be complete and healthy, in qualitative and quantitative terms. There was minimal use of sugar and saturated fats. At the same time, cuisines were explored not just from Portugal, but other cultures as well, such as Serbia and India, without once jeopardizing any of the core principles. The menus received positive reviews and were validated separately by a doctor of public health and a student of nutrition from the local university, both of whom the team had the good opportunity to invite as guests.

Together they did. Sharing, as one of the pillars of the plan, extended beyond the purviews which were originally anticipated. During times of duress, especially under financial and/or infrastructural constraints, human resources gain increased value, a theory which was realized in practice, through sharing tasks, costs, recipes and ideas for further development. Another dimension of sharing within the project caters to the interaction with the invited guests, with whom life experiences, motivations, and aspirations were exchanged, and who provided the team with the regular fillip required for supporting a constant process of evolution through evaluation.

The team members were also careful in **doing more with less**. Another prominent aspect that emerged was a growing consciousness towards the wider scope of the effort. Questions were made as to how could something, which was conceived as an individual concern about health in the face of a difficult financial situation, could embrace collective concerns about eating healthy in times of economic austerity; and how could community cooking and dining influence social bonding in fragmented societies. Additionally, a concerted effort was made to reduce material footprint by applying forethought across each course of action, from moderating the use of the gas stove to procuring unused utensils, and ensuring minimum leftovers or wastage. It became possible to create a diverse menu (consisting of 50 different menu options), and a lot of emphasis was given to eating fresh fruits and vegetables raw, thereby reducing energy consumption. There were many avenues, from broad to minute, where it became possible to optimize the use of resources, without compromising on the quality of our experience.

The team was l**earning on the go**. As iterated earlier, the planning stage of the project was conspicuous for its rapidity. The members relied more on the desperation of the situation and channelized their ‘gut instincts’ to experiment with a fluid and adaptable approach, and thus it was crucial for them to observe and document each stage of the project from the word go, to gain incremental learning, which was central to the success of the venture. A detailed consumption and expenditure database was maintained, and it was also found important to keep abreast with the availability of seasonal products, and best deals and promotions in local stores. Constant experimentation was done with different cooking techniques, recipes and fringe ingredients from a cultural standpoint, and this was recorded for future examination. The inherent fluidity of structure allowed for swift incorporation of the learnings into practice, as demonstrated by the base price reduction, and the discontinuation of soups in favour of fresh salads as the starting course, for reducing time and energy consumption.

The model is easily replicable. This experience was instrumental in promoting the age old virtues of sharing, and how collective conviction can expedite emancipation. However, it was also realized that the simplicity of the model made it easily replicable, and thus it had the potential to bring positives to a larger audience. To test this theory, the project was introduced to an external audience, with a view to expand its

impact. Quinta Pedagógica do Mitra (QM) is a community project located in Campanhã, one of the poorer parishes in the city of Porto, which engages community development related personal research interests of two UMP team members. QM is dedicated to promoting urban agriculture for the benefit of the local community, and to spread awareness on the importance of valuing and conserving natural resources. Every Saturday, a community lunch is held at QM, where in members of the community share home cooked food, and soup made from the farm's own produce. The UMP team participated in one of these community development sessions during which the topic of UMP was brought up and the members spoke about its principles and modest origins. After an initial stage of disbelief, the team was met with a bombardment of questions from highly curious participants on the nitty-gritties of the project. Soon after, QM started to provide vocational training on organic farming for the unemployed, and as a complementary initiative, a low budget lunch scheme was introduced at the cost of € 1,5 per meal for all participants involved in QM activities. Besides being cost effective and healthy, the lunches were aimed to improve social interaction between participants.

Figure 6.05 – The Frugal Food challenge invitation during Futureplaces 2014

6.1.6 **The Frugal Food Challenge**

The UMP team conducted a Citizen Lab Workshop, The Frugal Food Challenge, during the 7th edition of FuturePlaces, an annual Medialab for Citizenship held in Porto. The call was made through the FuturePlaces website (http://futureplaces.org/) with the following teaser:
1 Euro + 1 Stove + 2 Lunches + 2 Pans + 3 Hours + 3 Course Meals + 5 Guests + 5 Coordinators + 10 Participants + 1 Hell of a Frugal Food Experience!

The main goal was to recreate an authentic UMP experience, with a group of people unfamiliar with the project's principles and constraints, for the express purpose of spreading awareness of its possibilities.

Figure 6.06 – Pre-session briefing in progress

Setting € 1 per person for a complete meal, as a critical restriction that had to be addressed, was taken as a team decision to create a reasonable balance between challenge and feasibility of the task. The final budget for each session was adjusted according to the number of participants enrolling. The UMP team was responsible for presenting a brief, providing general guidance, and clarifying doubts that would emerge during the process. Direct help was offered wherever required, but the team focused more on close observation and documentation of the process.

Participation rates in first and second days were different but worked in an inversely positive way. This reaffirmed a conclusion that the UMP team already had already reached, that the fundamental principles of UMP could be held constant and different results could be achieved from just changing the variable inputs. During a lunch conversation, one of the guests, a doctor of public health, made a pertinent observation on the stance UMP is taking with regard to health, not just as a biological issue but also on the growing relevance of its social dimension. For the UMP, the experience reinforced their belief in the faculties of critical thought and swift action as forces of self and collective empowerment.

Figure 6.07 (Top) – A team deliberating on the course of action

Figure 6.08 (Bottom) – The limited preparation time reflected on choice of items

Figure 6.09 (Top) – The outcomes were healthy, cheap, and in time.

Figure 6.10 (Bottom) – The table being set for guests and participants

SESSION		Day 1_October 16th "The World Day of Food"	Day 2_October 17th
PEOPLE INVOLVED	Participants	9	3
	Guests	3	4
	UMP team	5	4
	Total dinners	17	11
TIME	(from briefing to cleaning)	3h45	3h45
MENU	Starter	Apple, tomato salad and red cabbage salad with a Finnish twist	Red cabbage and apple salad with vinaigrette and herbs
	Main course	Chickpea stew, pan fried vegetables and steamed rice	Creamy chicken rice with carrots and red beans
	Desert	Orange salad with mint and choco-chips	Tangerines with passion fruit yogurt, cinnamon and lavender
	Drink	Limeade	Spiced lemonade
BUDGET	(per person)	**15,98€** (0,94€)	**7,78€** (0,70€)

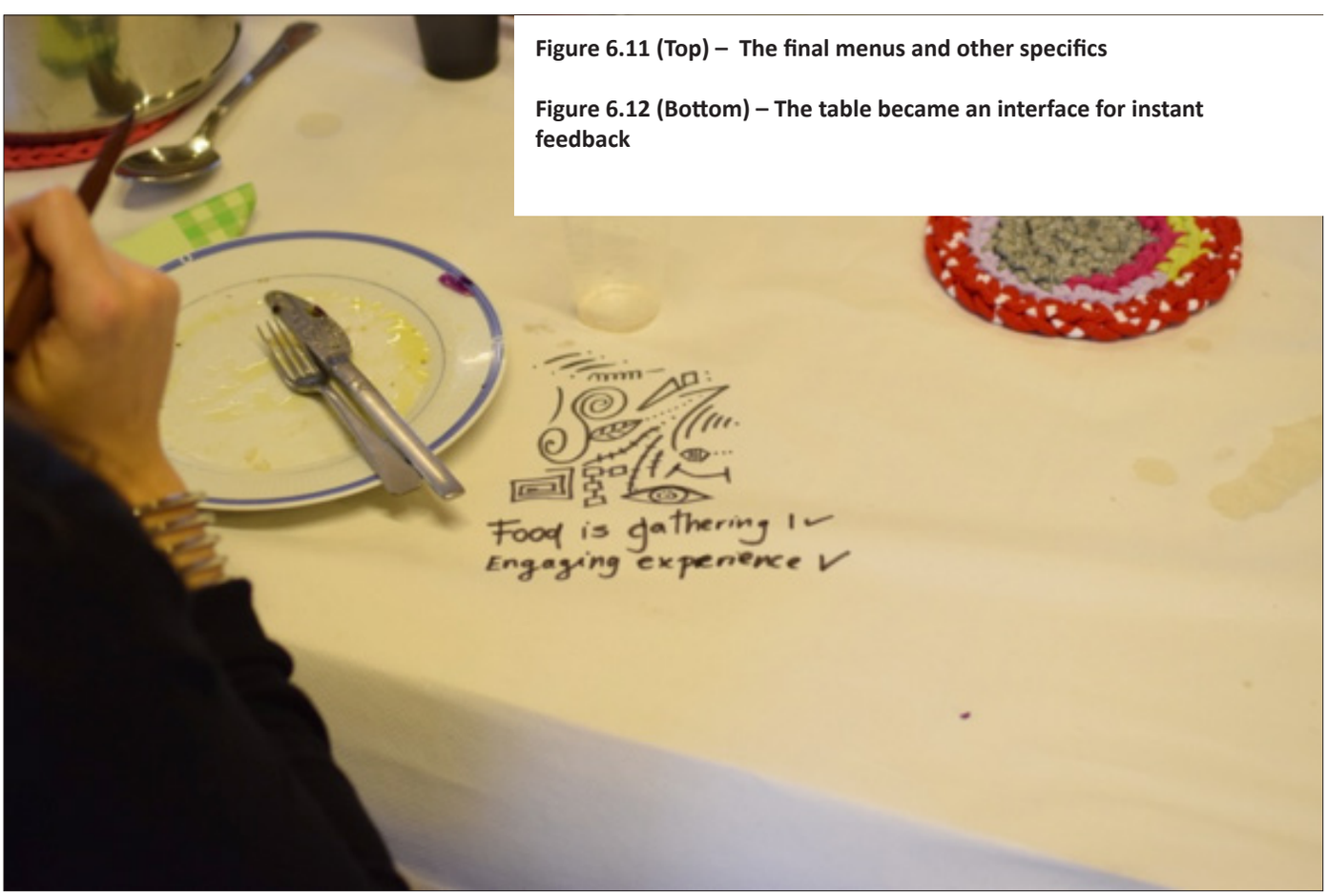


Figure 6.11 (Top) – The final menus and other specifics

Figure 6.12 (Bottom) – The table became an interface for instant feedback

6.1.7 **Conclusions and Further Developments**

Without reiterating all learnings and positives from the UMP experience, it would be pertinent to conclude by saying that the UMP team started with a principle of 'where there is a will, there is a way,' and by the end of the first phase, arrived at a simple and yet efficient means to not only eat well and eat healthy, but also to sample cuisines from Portugal and around the world; create novel recipes and experiment with new cooking tricks; get to know new people and share experiences; and above all, have an engrossing time over a lunch break.

There were a number of secondary positives which became apparent. The team gelled well together; gained knowledge in terms of gastronomy and nutrition— fields which were consider related to design previously— and most importantly, became conscious of what exactly money can buy. The project, has proved to be a valuable experience, and the research considers it a genuine forerunner to many of its concluding philosophies: such as a resilient attitude to difficult situations; the leveraging of materials and past experiences; arriving at concrete solutions that are easy to replicate; and making creative reformative action which entails socio-cultural and socio-economic relevance.

To highlight the latter aspect, as stated earlier, facets of the project have now been incorporated in Cecilia Carvalho's (a UMP team member) PhD research, and includes further development of the model, with a focus on additional reduction of energy and time consumption. This has necessitated a rethinking of menus and/or preparation techniques from the ground up, through the usual process of constant experimentation.

Secondly, the search for possibilities of being positively impactful to the community at large continues. The intention is to widen the scope of opportunities is being implemented through further dissemination in conferences, workshops, blogs and social networks. Finally, the eventual triumph of the project lies in telling the story and inspiring friends and colleagues to not undermine the hidden potential of restrictive situations for stimulating radical change, and employing the faculties of critical thinking and swift action to take relevant steps for individual and collective betterment— and not merely in terms of food!

Figure 6.13 – Lalaland provided a good mix of natural and built habitat for experimentation

6.2 **Photoplay at Lalaland**

Photoplay is a Designrascar Citizen lab that was created for Futureplaces 2015, and took place in 'Lalaland' a dilapidated urban 'ruin' situated near UPTEC PINC in Porto, with students from the Faculty of Fine Arts, University of Porto, on 25 September 2015. The workshop was held in collaboration with Professor João Cruz of FBAUP.

Lalaland is a project under Futureplaces since 2015. The space is described by the researcher as follows:

Lalaland (definition)

A fictional, nonphysical place where people out of touch with reality live and where nonsensical ideas come from; often used sarcastically pertaining to where one's mind has gone

Where have you been: Lalaland? (said to a person whose mind was wandering.)

She lives out in Lalaland. (said of a person considered out of touch with reality.)

There is a touch of satire to everything in Lalaland. Within the remains of what was, hide small inklings to what might. Books and manuscripts that once served to inform pursuers of science lie strewn across floors of the central edifice, overrun by creepers . The Bamboo thicket flourishes alongside a rubbish pile for chemical containers. A door stands elsewhere, duteously locked, unaware of the ceiling long caved in. Verdant greenery encompasses the rust and bister of decay, remonstrating in the very spirit of benevolent anger.

Often, as we enter, the large generator - one of Lalaland's most delicious ironies - seems to chug to life, like a cantankerous old operator heaving forth the hand-crank to a long forgotten amusement park, animating torpidly its various wonders. It isn´t difficult to imagine those great green doors in likeness of the Narnian wardrobe, a magical portal that removes us from our daily insincerities, if only for a brief while.

The objective of the workshop was to inform this research on two fronts – firstly to validate phenomenography as an admissible method to appreciate individuality of approach in creative improvisation; and secondly, to observe first hand, the interaction between improvisers and a restrictive situation replete with both critical limitations and resources that are heterogeneous and abstract. The aim was thus to instigate a creative dialogue between the space and the student participants, that would culminate into a creative solution— in this case, a play of images which reflected upon the participants' understanding, interaction, and experience of Lalaland. The restrictive factors were: time, since the students had a total of 3 hours for the completion of the whole exercise; limitations pertaining to space, since Lalaland and its accompanying debris were yet abstract and had to be denoted meaning by the improvisers; and synergy, which required initiation and conditioning, not only between the situation, its resources, and the improviser, but also between the individual streams of ideation, because this was a group exercise.

In the first phase of the workshop, the participants were introduced to the space and left to explore independently. At the end of their individual explorations, they were asked to propose one keyword which would best summarise their impression and experience of the space.The participants were subsequently divided into groups of 2-3. They were then required to consider and bring out the common narrative between each of the individual keywords within their group, with a view to initiate synergy, through a set of pictures taken in or inspired from Lalaland, either in motion or still. In total, there were 7 participating groups. The PhD studio of UPTEC PINC nearby became the impromptu base camp for planning, production and post-production work.There were a number of different approaches to be observed in the participants' attempts to bring to light the common narrative. While some were clearly more impressed by the physical space, others sought inspiration from the bountiful miscellany residing in Lalaland. What primarily emerged from the dialogic exercise was a substantial amount of phenomenographic data supporting the argument that uncomfortable and restrictive circumstances liberate – not limit – creativity.

In Lalaland, the students experienced a situation of 'multiplicity' (Deleuze, 1991) where in they initiated a creative process of unexpected encounters to create novelty. Describing his experience with the concept of the exercise, Professor João Cruz provided the following feedback:

> *The kind of experience that this type of workshop investigates it's very close to what I think are central concerns in design thinking. We probably could articulate this relationship in the tension between creativity and context constraints or that creativity is a key element to overcome constraints. I'm also very found of the idea of locus exploration, of approaching a specific place without preconceptions and build something out of existing assets in a close relationship with your expertise and skill-set. In other words, testing your creativity or at least expose its basic elements in order to come to terms with its core vocabulary.*
>
> *With this said, I was very happy to collaborate with my design students' team as I thought that a project with this characteristic was a perfect kick-off to my design syllabus. My role was off-course more of an observer and a workflow facilitator, nevertheless I was able to witness the overall creative environment that the workshop generated and happy to assess its overall positive results. So all in all a very pleasant and extremely interesting experience.*
>
> (Cruz, 2015)

Figure 6.14 (Top) – Prof. Cruz provided further insights into the workshop objectives

Figure 6.15 (Bottom) – The floor of the edifice was littered with potential resources for creative manipulation

Figure 6.16 (Top) – The students deliberated on various modes of representation to depict their impression of the space

Figure 6.17 (Bottom) – The resources proved instrumental in giving individual narratives distinctive flavours

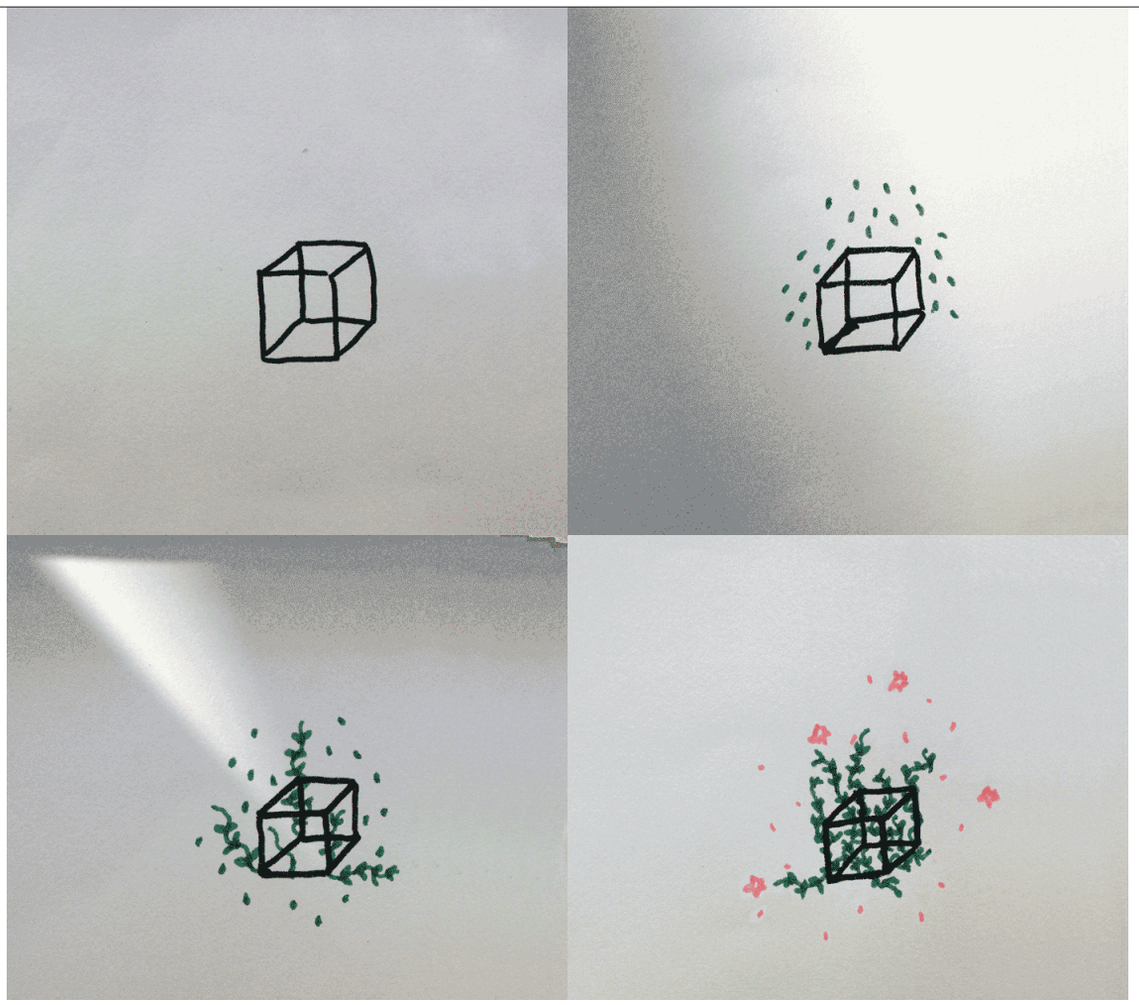


Figure 6.18
The results ranged from symbolic representation of the space to photographic depiction of the sensorial experience

6.3 **Bag Unbag**

Designrascar exercises and experiments are phenomenographic, and predominantly simulative in nature. The base objective of the exercises is not to deliberate on a solution regarding the issue of sustainability, but to advance the cause of a design ethos which is not intimidated by resource scarcity. Participants in Designrascar exercises are encouraged to initiate in a constant dialogue with the presented environment and/or available resources, in order to comprehend their situational challenge better, and to understand the material/physical aspects of their resources thoroughly before engaging in an (if required, iterative) act of solution oriented creative exploration. The underlying philosophical narrative sees a restrictive, resource deprived and/or atypical situation as a causality, and original utilisation of means as its automatic effect, thereby drawing analogic comparisons with the concept of Eco-Efficiency which endorses more efficient utilisation of materials and energy in order to reduce economic costs and environmental impacts (Iisd. org, 2015). This congruency between the two notions, although apparent, is however unsound since it is impractical to align improvements in unit efficiency with levels of consumption (Iisd.org, 2015).

'Sustainable development' is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland, 1987). With the word 'development' in tow, niceties, sophistications and contradictions (Idowu et al., 2015) abate to concede an interminably proliferating flux of demand and supply, thereby inviting further derivations from the broader spectrum of Sustainability in the form of equally Delphian concepts, namely Sustainable Consumption and Sustainable Production. Although the Brundtland definition is widely regarded and used in matters pertaining to Sustainability, in the view of this research, the commission side-steps the vital issues of "Needs vs. Wants," and is thus dubitable as a stable foundation for a design ethos.

To illustrate this further:

1. One of its two key concepts is the concept of "needs," which is referred to expressly in terms of essential needs of the world's poor, without defining a global standard of sustainable consumption for the aforementioned essential needs. Material footprint indices indicate the hegemony of non-poor sections of the world in terms of per-capita resource consumption (Wiedmann et al., 2013).

2. It does not factor in the concept of "wants," a major driver in the consumption of resources, and a serious impediment to any deliberation on the theme of sustainability. The situations may seemingly exacerbate due to many factors, such as a worldwide surge in purchasing power, unprecedented advancements in technology and logistics, and a greater global movement of products and services.

3. Sustainable consumption is perceptibly disadvantaged due to the incommensurate nature of relationship between production and consumption. Consumers are expected to factor in the effect of their consumption on the planet, people and profit of companies (Idowu et al., 2015), without adequate availability of accurate corresponding information on behalf of the producers.

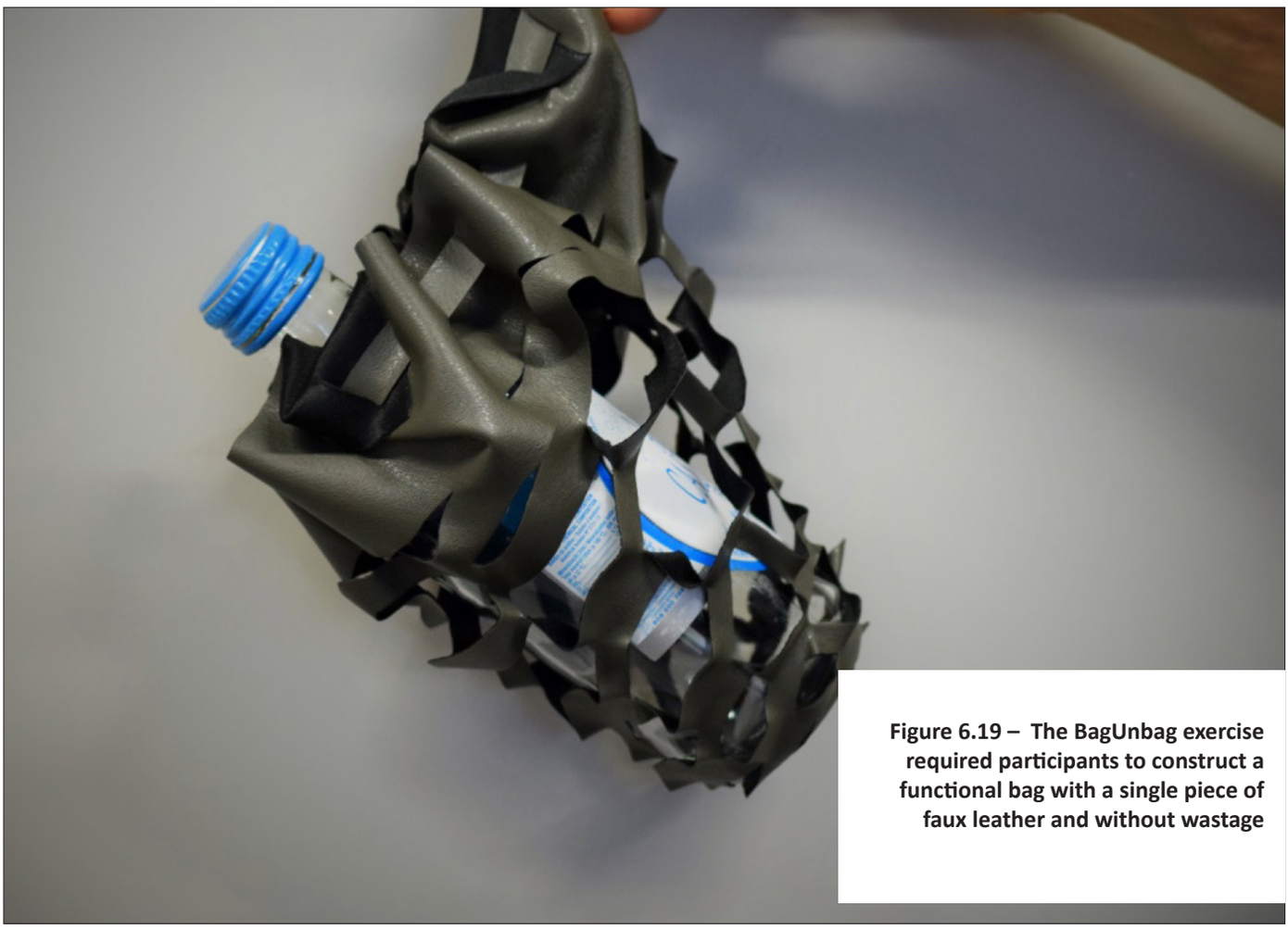


Figure 6.19 – The BagUnbag exercise required participants to construct a functional bag with a single piece of faux leather and without wastage

4. The Profit dimension of producing goods and services ensures an asymmetric balance between seeking economic growth and engaging in sustainable production.

In comparison, the attitude towards design which this research finds relevant to inculcate, is based on factoring in harsher ground realities, and derives its inspiration from cultures and historical instances, where and when instinctive human ingenuity has been able to mitigate situations of extreme resource inadequacy. If one considers the elemental rationale behind Sustainability as an endurance of systems and processes (Environment.uci.edu, 2015), then a majority of the representational cases studied to develop the framework of Designrascar can effectively exemplify the associated struggle in terms of the aforementioned endurance. Designrascar's diligence lies on design education, and the maturation of the stated ethos, which may then be scaled or adapted to meet specific requirements in industries fed by design.

Furthermore, the case of the BagUnbag exercise, conducted with the students of Eco Design and Sustainability in collaboration with Professor Susana Barreto, the central idea was to develop a product—a bag—from a square piece of leatherette, but with a base constraint of incurring 0% solid waste. By interweaving a no waste criterion into the design brief itself, the exercise sought to present the participants with an unconventional design challenge, where in they were required to strike a delicate balance between aesthetics and functionality in accordance with a third additional component—that of zero wastage. In order to do so, they had to explore and comprehend the physical and material aspects of their resources (square pieces of leatherette, glue and cutter), and consult personal experiences, knowledge and expertise.

The resulting products were naturally diverse, in consideration of the variegation of individual approaches, and from the overall outcome of the experiment, the potential for positive ramifications that such a design ethos may have in an actual industrial context, was apparent – for example in the industry of footwear and leather goods, where the percentage of solid wastage varies from 20-65% (UNIDO, 2000). This BagUnbag exercise also exposed a key challenge that Designrascar faces ahead of deployment in design education – that of persisting inflexibility in current practices and ideologies. The design brief, in consideration of the phenomenographic nature of the assignment, required the participating students to explain their ideation process, the evolution of their concept, and the subsequent action of implementation, in addition to presenting their products.

The presentation session was scheduled for a corresponding class day, with an aim to retrieve phenomenographic data through observing the miscellany of individual approaches employed in countering given constraints. Ideally, this extended period between creative action and presentation should have given adequate time to the participating students to affectingly reflect upon their personal contrivances, however, in course of the interval an objection was raised from another member of staff regarding the use of leatherette as a choice of material, in lieu of its perception as non-biodegradable, which adversely altered the participants' concomitance to the project.

The consequent presentations, as observed by Prof. Susana Barreto, were symmetrical in nature and content, with limited or no compliance to the original design brief, and instead focussed on the toxicity aspect of the material and discussed viable greener alternatives, akin to presentations on material science. Although detrimental to the core objectives of the project, this particular experience served as a precedent of the veritable rig between classroom and reality, and thus strengthened the researcher's case for Designrascar's more utilitarian and unidealistic, if disruptive, approach to design challenges.

Figure 6.20 – The participants made paper proxies before handling faux leather which helped gain an understanding of the exercise, and to determine their approach

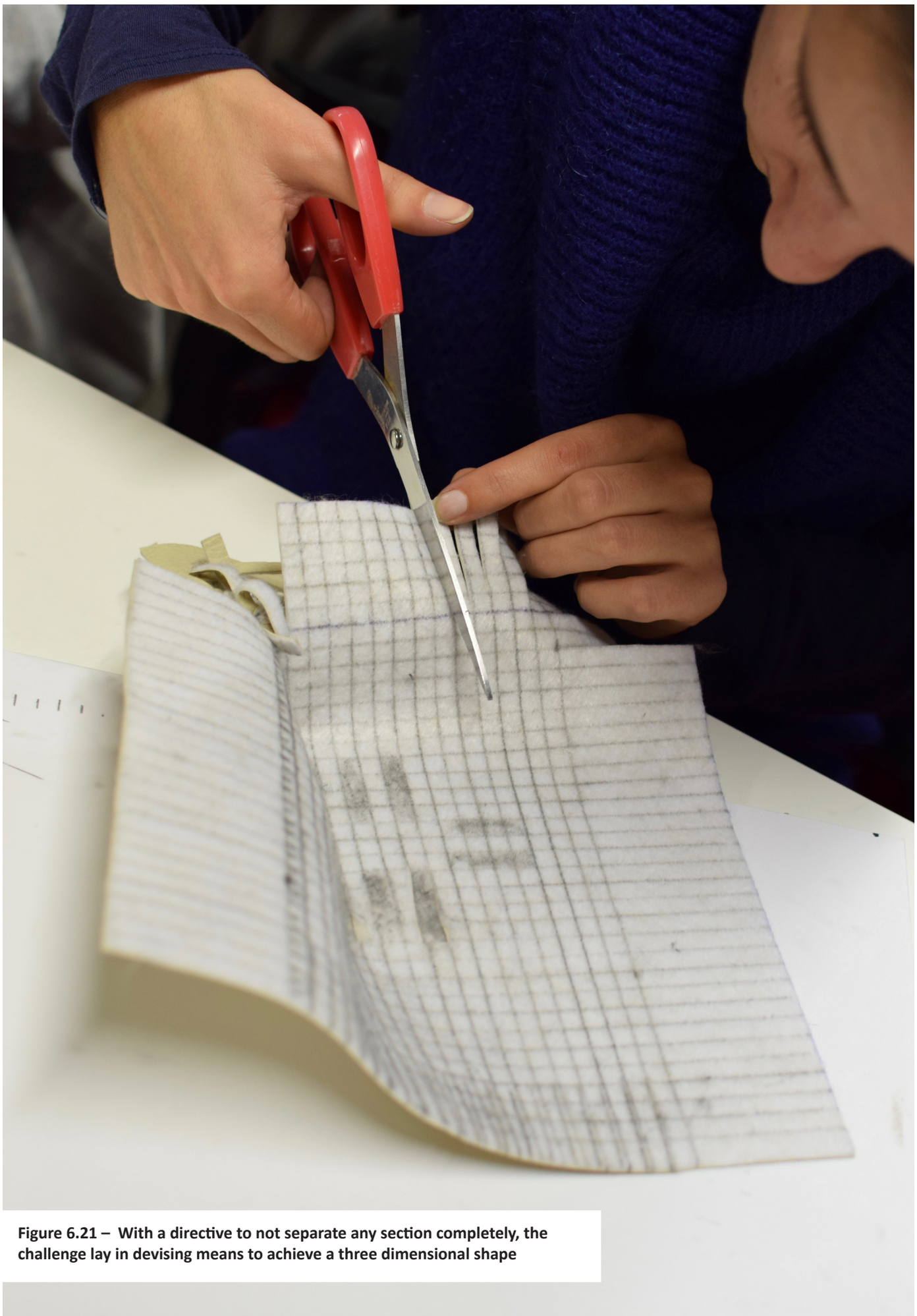


Figure 6.21 – With a directive to not separate any section completely, the challenge lay in devising means to achieve a three dimensional shape

Figure 6.22 – Despite unconventional aesthetics, the bags proved sufficiently functional. The bag openings proved challenging to achieve, but the end results in some of the cases were genuinely novel

6.4 **PET Project**

The PET Project was a workshop conducted with Masters students of Industrial Design at the Faculty of Engineering, University of Porto. The three-session exercise was held in conjunction with Prof. Susana Barreto, as a part of her subject, Eco-design and Sustainability, and focussed on offsetting the environmental impact of PET bottles through resourceful reutilization.

The project was conducted as a group exercise with 2-3 participants per group. The students were required to procure beforehand, a cache of PET bottles in diverse size range and consistency. n the first session, the project was explained in the context of the related research, and examples were provided from the world over, which corresponded with the aims of the exercise. The students were then given an explanation of the expected outcomes, along with other aspects such as other permissible materials, and were instructed to form groups.

In conjunction to the examples shown, each participating group was required to target a real-world problem (and not generic objects such as flower vases) that could potentially be tackled by the re-use and repurposing of PET bottles. The students were then required to develop a working prototype, either life-size or in scale. The objectives of this exercise were:

- To research on, and select a real-world local/global/glocal problem that could be tackled by means of Designrascar using PET which is an otherwise ecologically unsustainable resource.
- To utilise PET bottles as the primary resource for the exercise, although in accordance with specific solution related requirements, widely available and/or easily accessible secondary resources can be used.
- To re-imagine the physical/material characteristics of PET as a resource and consider the different ways the same can be exploited, either individually or in collaboration with other materials.
- To build a working prototype of the intended solution based on the above.

In consideration of the tools and materials required for constructing the prototypes, the students were made aware to not compromise on the following aspects of exercise:

- Safety - The participants were expected to conduct prior research on cutting and binding agents before selecting their supporting resource items of choice. PET is prone to react adversely with certain glues and can also prove to be sharp, thus requiring caution.
- Quality - The participants were required to ensure a workable quality for objects produced which did not hamper the usage experience of the proposed end user
- Functionality - The participants were required to accomplish the addressing of the particular need without any compromise. In other words, the prototype had to be functional and not just directional.

The two additional sessions of 3 hours each were thus devoted to conceptualization, and the development of the prototype.

In relation to the research, there was a critical aspect of Designrascar being represented by this series. The research considers garbage as a valid resource of the future, and reinterpreting its materiality and physicality may perhaps be the first step towards reimagining its potential. The PET bottle, although pre-confined in terms of materiality and shape, if need be, has been repurposed in a plenitude of different manners around the world to attain functional and colourful solutions. In cases such as the Liter of Light project, a PET bottle when used in conjunction to other readily available materials, has proved adept at transcending its own originally intended ambit, thereby supports one of the core Designrascar premises which reasons the admixing of heterogeneous resources to augment and/or amplify inherent individual values. By engaging with real world issues, albeit in simulation, the exercise aspired to test the above in conjunction with the 'need based only' facet of Designrascar.

6.5 **MagDash**

The MagDash exercise was conducted in April 2016, with the students of Communication Design from the Faculty of Fine Arts, University of Porto, in conjunction with Prof. Pedro Cardoso. The crux of the project lay around reinterpretation of physical and material characteristics of available resources for attaining a creative solution, while in a simulated situation of resource paucity. In this case, old magazines were chosen as the core material whose various attributes had to be explored by the participants for attaining a predefined creative solution – objects of various nature.

The workshop was conducted as a group exercise where in the participating students were required to bring three old magazines each of medium to thick width. Since the exercise involved magazine paper as the base material, only scissors or cutters and glue were allowed for modification, along with cutting mats for construction purposes.

There were 10 groups of 5 students each, and the students were required to pool in their resources and construct one of the following products:

- A Table or Floor Lamp
- A Handbag or Backpack
- A Corner Shelf
- A Dress or Costume
- A Chair
- A Robotic Prosthesis
- A Wall Clock
- A Guitar
- A Radio or a Music Player
- A Standee for coats or umbrellas
- A Pet Kennel
- An arrangement of a Wash Basin, with a tap and a sink
- A Machine Gun

The products were allotted to individual groups randomly, through lots.

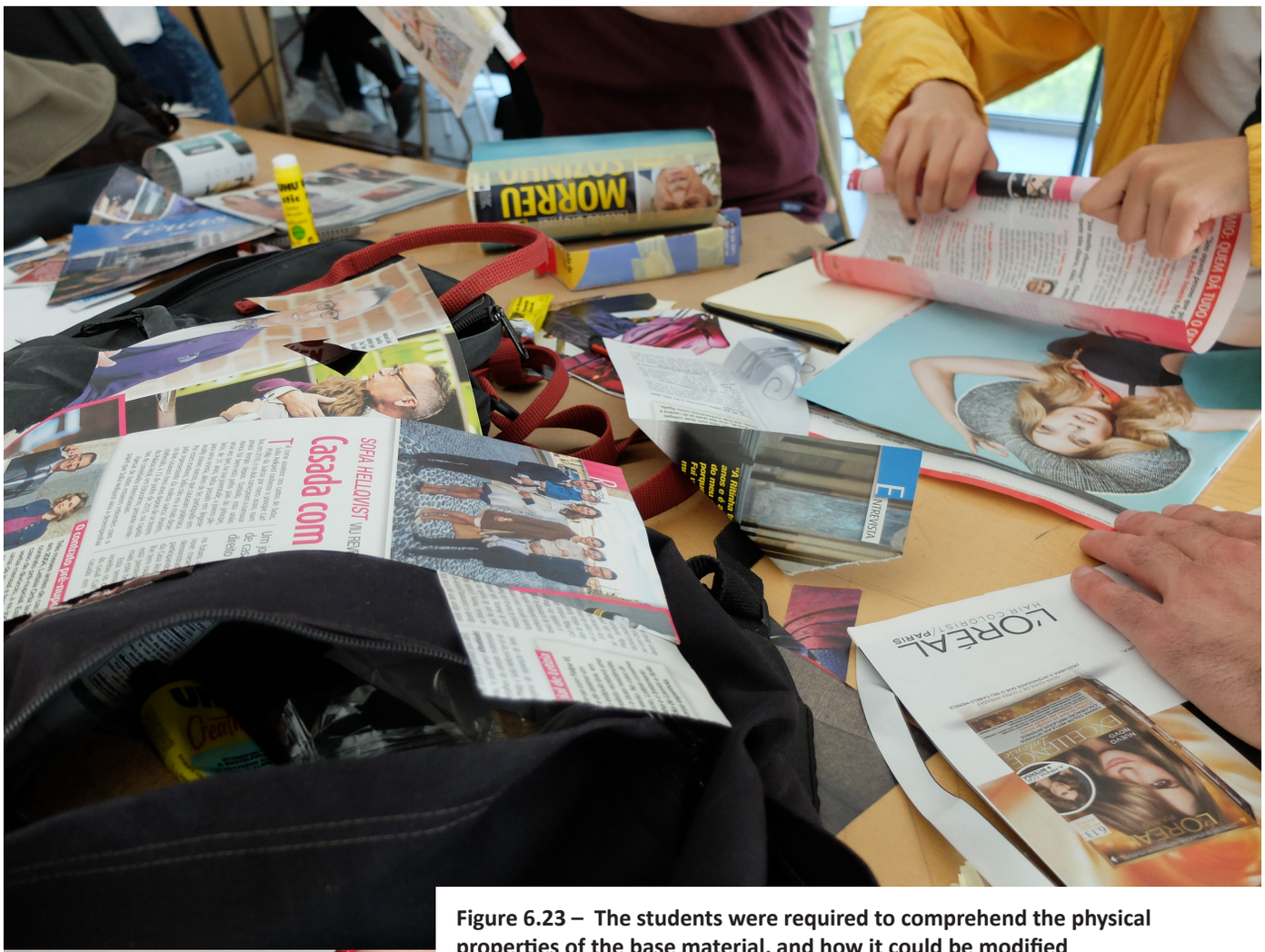
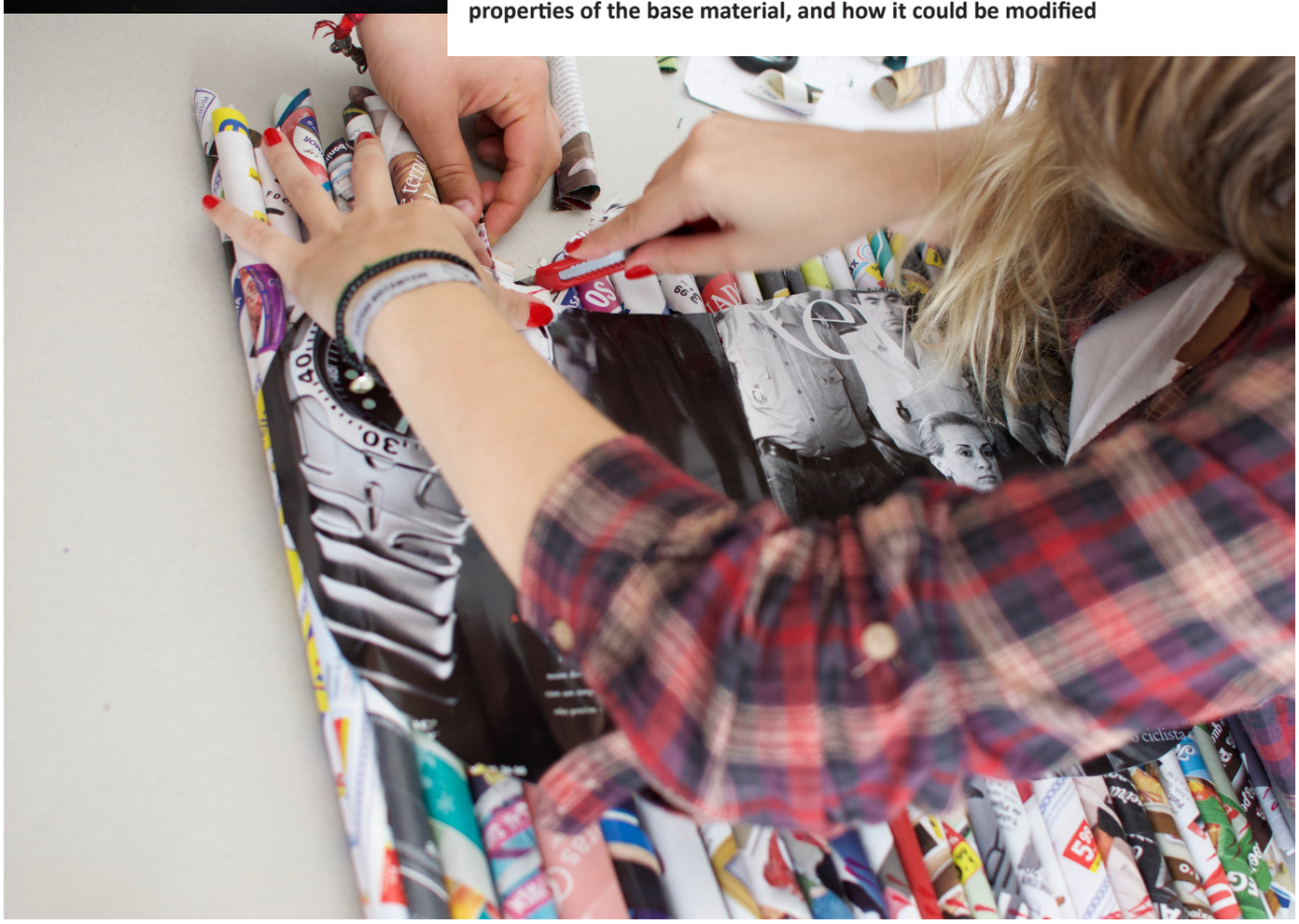


Figure 6.23 – The students were required to comprehend the physical properties of the base material, and how it could be modified



Alongside the product, the students were also asked to make a mood board for their product which would not only introduce the product concept in sensorial terms, but also provide an idea of the associated market that the product may cater to. In order to make the client selection process a lesser hassle, the participants were asked to select a client from the very first magazine of their pile.

As with all Designrascar exercises, here too certain restrictions were imposed, with an aim to urge and encourage the participants' natural proclivity to improvise. All results of the exercise, including the construction of the object and the mood board, had to be accomplished within the duration of two hours. Alongside, the material restrictions included a single base material (magazine paper) and basic modification agents (glue and cutters).

For the participating groups, the exercise offered enhancement to their already existing dynamics (the groups were predefined for the entirety of the semester for different exercises), but in a time-bound, fast paced project. The exercise sought to provide the students, additionally, with a brief introduction to the type of creative rigour which exists in industries related to product and fashion design, where creative production is also principally time-bound and is required to work around resource limitations.

From the point of view of the research, the MagDash aimed specifically to test and observe in practice, the theory behind the physical and material reinterpretation of resources, beyond their original purpose. In this case, the essence of the challenge lay in the modification of a two-dimensional resource into a three-dimensional object. In terms of phenomenography, the observations noted the variety of approaches individual group employed in achieving the said transition. For example, some groups rolled up single sheets and stuck them together to achieve three-dimensional forms, while others achieved the same through crumpling, folding, and origami. The teams thereby leveraged not only their physical resources, but also their knowledge and experience in working with paper. Further on, the distribution of responsibilities within the groups in accordance to the same suggested a rapid identification of individual competencies and their allocation, in the form of functional components, to specific tasks towards the overall attaining of the required solution.

Professor Pedro Cardoso weighs in on this aspect of the exercise in his feedback by saying:

> *I think it was great in promoting fast action, and quick decision-making. It made students be aware that they are able to solve problems or to come up with answers (even if preliminary) for their projects with what is immediately available to them. I also think that the restraints of the exercise promoted a deep sense of focus on the goals, and heightened or sharpened their creative instinct – if you want to put it in these terms.*
> (Cardoso, 2017)

GRUPO 1.2

Figure 6.24 (Top) – Professor Cardoso engaged with the students in discussing possibilities

Figure 6.25 (Bottom) – Each item was accompanied by a corresponding mood board which introduced the concept behind in sensorial terms

Figure 6.26 (Top) – The products were made to be life-size

Figure 6.27 (Bottom) – Different techniques such as rolling, crumpling, origami, and folding were adopted to transform a two-dimensional material into three-dimensional

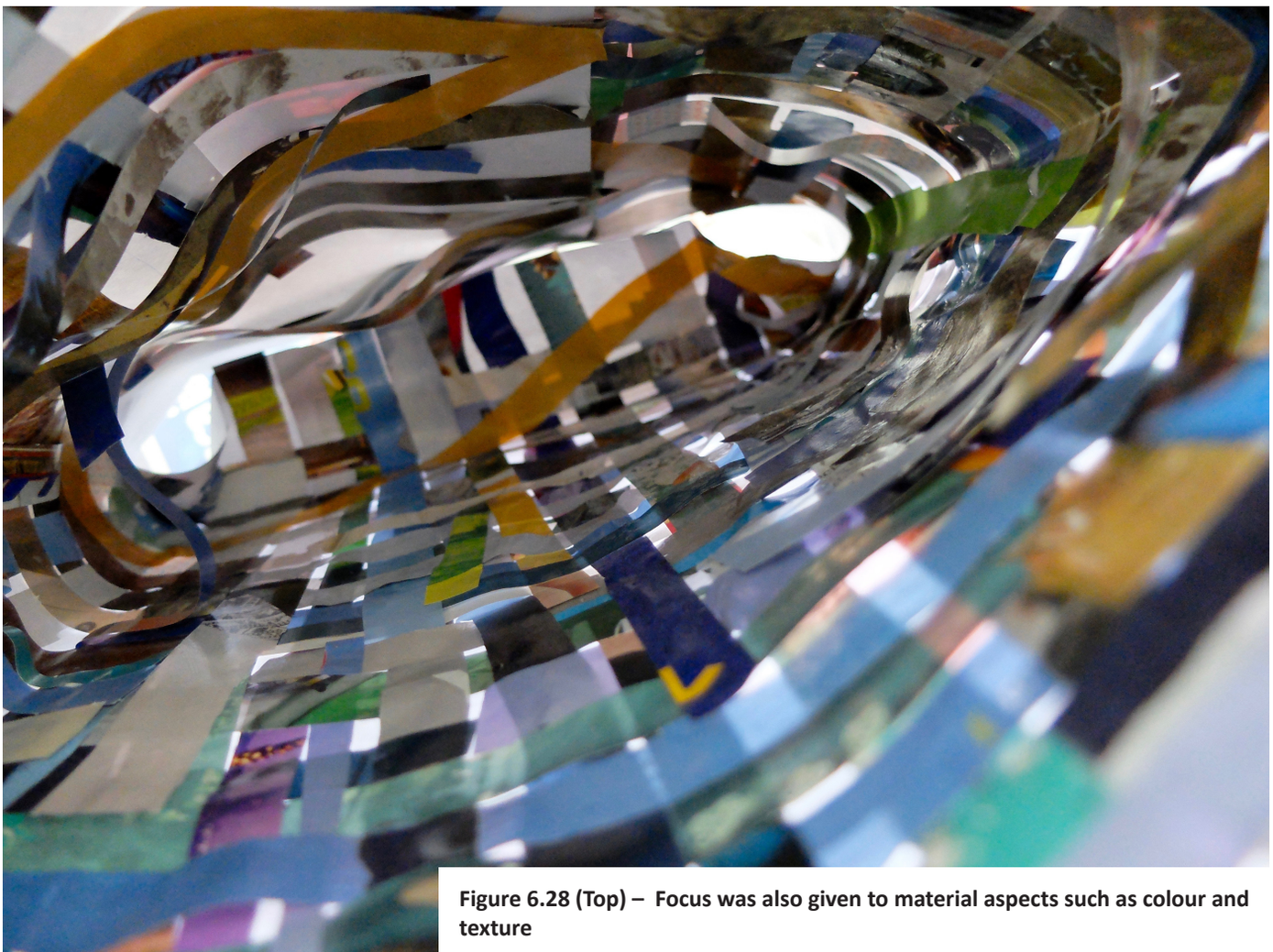
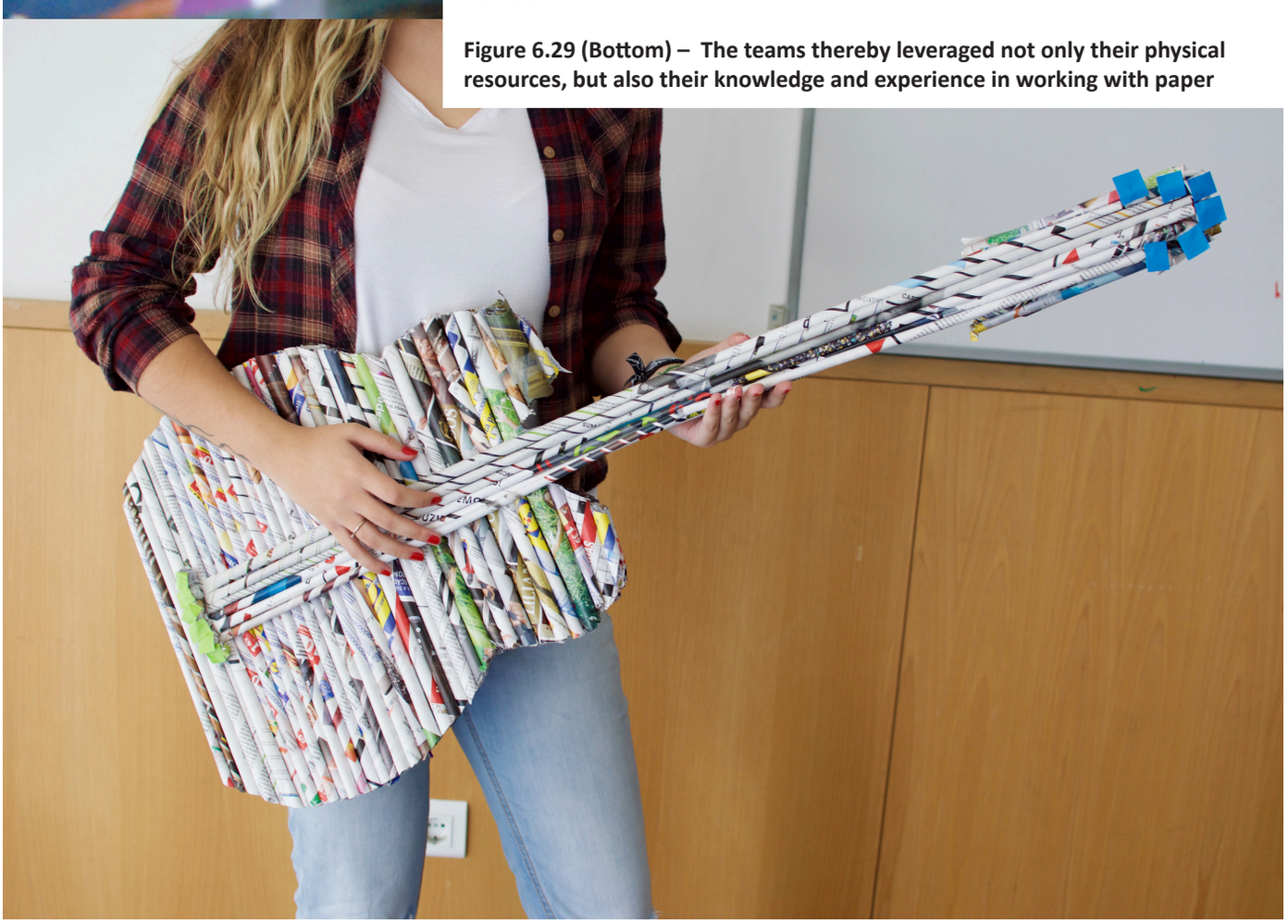


Figure 6.28 (Top) – Focus was also given to material aspects such as colour and texture

Figure 6.29 (Bottom) – The teams thereby leveraged not only their physical resources, but also their knowledge and experience in working with paper



Chapter 7

Cortebel 50

Figure 7.01 – Cortebel 50 is a collaborative project between Cortebel, ID+, PhD Design Program at FBAUP, and UPTEC

L–R: Prof. Pedro Carvalho de Almeida (ID+), Sr. Paulo Albergaria (Cortebel), Clara Gonçalves (UPTEC), Prof. Susana Barreto (Co-director, PhD Design), Prof. Heitor Alvelos (Director, PhD Design), Fátima São Simão (UPTEC, PINC), Abhishek Chatterjee (PhD Candidate, PhD Design)

Cortebel 50 is an ongoing collaborative design research initiative that merges the theoretical and practical components of three distinctive research projects, including Designrascar. The project was initiated in Cortebel, an iconic Portuguese footwear manufacturing firm, in 2015, in conjunction with Prof. Pedro Carvalho de Almeida. In 2016, a new chapter to the initiative commenced with the integration of PhD Design colleague António João Gomes's research project 'Almalaguês'.

Figure 7.02 – Prof. Pedro Carvalho Almeida's research with Cortebel has included unravelling the brand's past in terms of products, visual identity, and material culture

Prof. de Almeida's action-research project 'Brand Archives' concerns the employment of "Brand Archaeology" (de Almeida, 2012, pp. 87-97) as methods in design research, specifically in the area of brand identity, for the recovery, organization, and utilization of entrepreneurial or corporate archives. As of now, his research is focussed on heritage Portuguese brands which are either vulnerable to retrogressing, or may have already displaced their ipseity. Cortebel, where Brand Archives is presently developing a related design intervention, is among certain iconic Portuguese brands which had their heydays in the latter half of the 20th century, but are now in the state of terminal decline due to a string of internal and external factors. Their industrial history and legacy thus faces public oblivion – a situation that Brand Archives aims to address through archival research into their contextual history. The subsequent outcomes are then regarded as generative materials for corporate innovation and memorialization.

Designrascar, in furtherance, found common ground for collaboration with Brand Archives, through an exchange of mutual interest in the field of Footwear design and technology since the researcher has holds previous experience in the field as a designer and buyer. Also, the research setting in Cortebel presented both restrictions, and the opportunity to improvise in the interest of innovation.

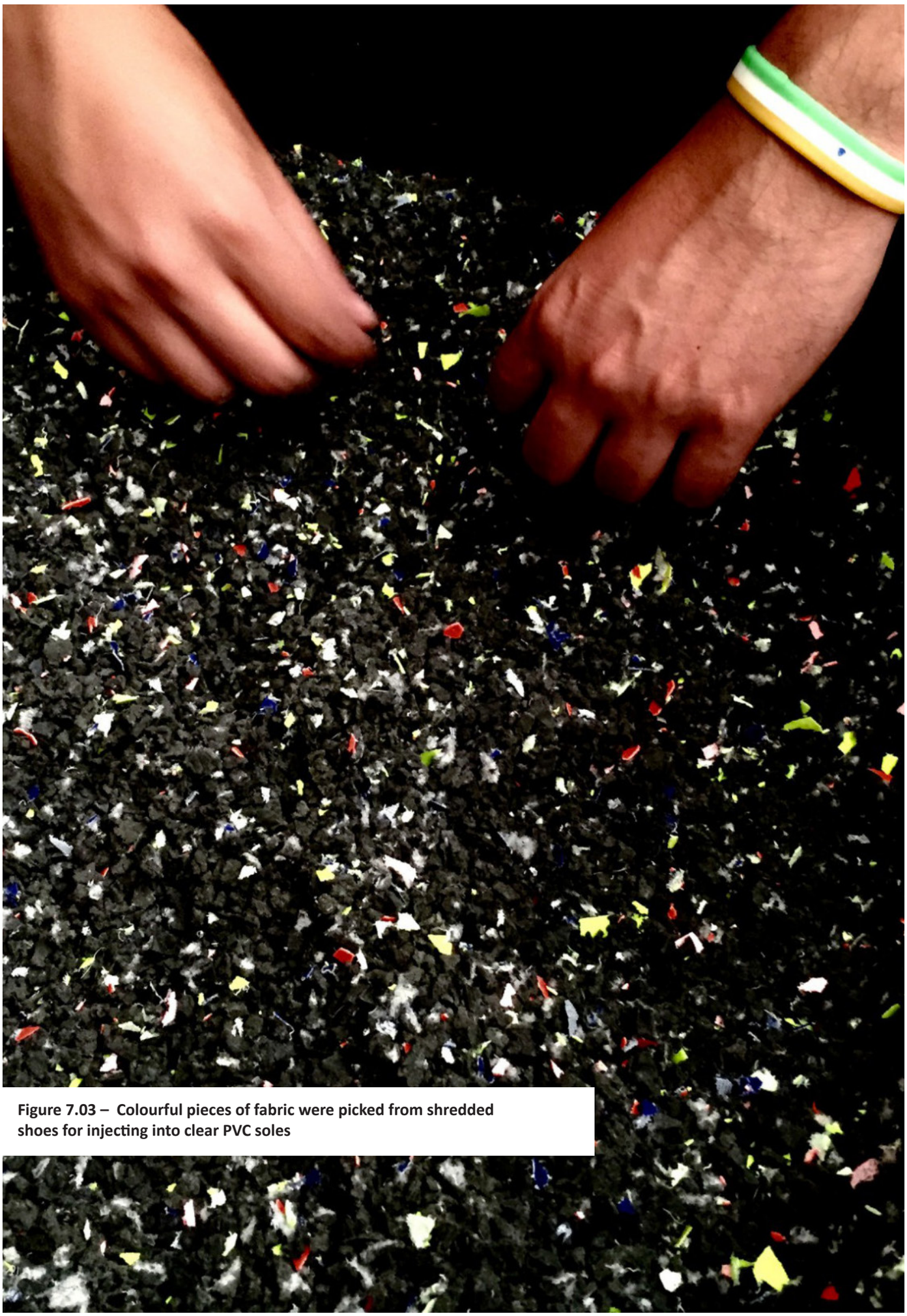


Figure 7.03 – Colourful pieces of fabric were picked from shredded shoes for injecting into clear PVC soles

The collaboration commenced with a thorough synopsis, on Prof. de Almeida's behalf, of the brand's history and its significance to the golden age of Portuguese sneaker manufacturing, and its iconic product ranges. The predicaments were then explained, which the company faces in terms of resources constraints—both human and material—due to a gradual decline owing to a variety of factors. Thereby, from the initial impression onwards, the situation impressed upon as being a fertile breeding ground for Designrascar to contemplate an undertaking in a real-world industrial setup. The possibility to experiment with the company's resources, and the archival materials generated by Brand Archives, subsequently emerged in light of genuine empathy to our research interests shown by the owner of the enterprise.

The practical component came into effect with experimentations in the injection process of soles, where the primary objective was to propose freshness to the corresponding ranges by introducing non-traditional colours and materials. This experiment involved sourcing the said colours and materials from the immediate environment, which in this case were the factory premises, and consequently, unusual pieces of discarded materials were applied during the injection process. The initial attempt at interaction with Cortebel's resources and technologies thus yielded a hybridized collection of soles, however, during this intervention, it became possible to establish the existence of large amounts of excess stock in regular materials such as leather and textiles, that were either leftover from previous production orders or may have been procured for eventually scrapped projects. This lead to a further requisition to Cortebel for developing a range of footwear, which could fit within the definitions of corporate innovation, and could also help synthesize this stock of extraneous and notably heterogeneous material into an agent of context and reflection for Cortebel and its industrial legacy. In this way, a proposal was made to Cortebel for developing a range that marked the Golden Jubilee of Cortebel as a brand, celebrated its significance and contribution to the Portuguese footwear industry, and in process, actualized into tangible outcomes for the two research projects involved.

Figure 7.04 – Cortebel factory premises provide an evidence of a prosperous past, but at present the company faces financial decline

7.1 **Role of Designrascar**

For Designrascar to work as a viable methodology in creative production, the existence of two decisive cornerstones is mandatory, namely, a pressing need that it can be consonant with, and secondly, a relative situation of resource constraints which requires creative manoeuvring.

In the case of the Cortebel 50 range and project, the need aspect becomes apparent when the massive decline the company has faced over the past two decades is taken into account, which has brought with it debilitating consequences including financial losses, loss of key clients and distribution networks, the dismantling of entire production sections and discarding or ossification of key assets, and an extensive reduction in the workforce. Hence an overall decrement of the brand potential has taken effect, not only in terms of its production capacity, but concerns have also emerged regarding its contemporary and future relevance.

Figure 7.05 – Footwear in Cortebel is predominantly produced through injection, and expensive-to-produce moulds are a pre-requisite

The second cornerstone of constraints thus concerns the company's incapacity at present to:

- De-ossify a large section of its existing assets, including various machinery and other infrastructure;
- Invest in new infrastructures, such as shoe moulds, cutting knives, and state-of-the-art materials and equipment;
- Hire key personnel to help mitigate existing circumstances;
- Compete adequately with other players in national and international markets

Thereby, during the course of the Cortebel 50 project, a considerable number of limitations were faced in terms of: accessible operatives and expertise; accessible machinery and equipment; the availability of upper patterns and sole moulds; the availability of non-basic PVC tints; and finally, finances for further investment into R&D. In which case, it became imminently clear that in order to leverage and optimise the available human, material, and infrastructural resources, the primary role of Designrascar would have to be to utilise the said limitations in a way in which they could work in favour of the project's objectives.

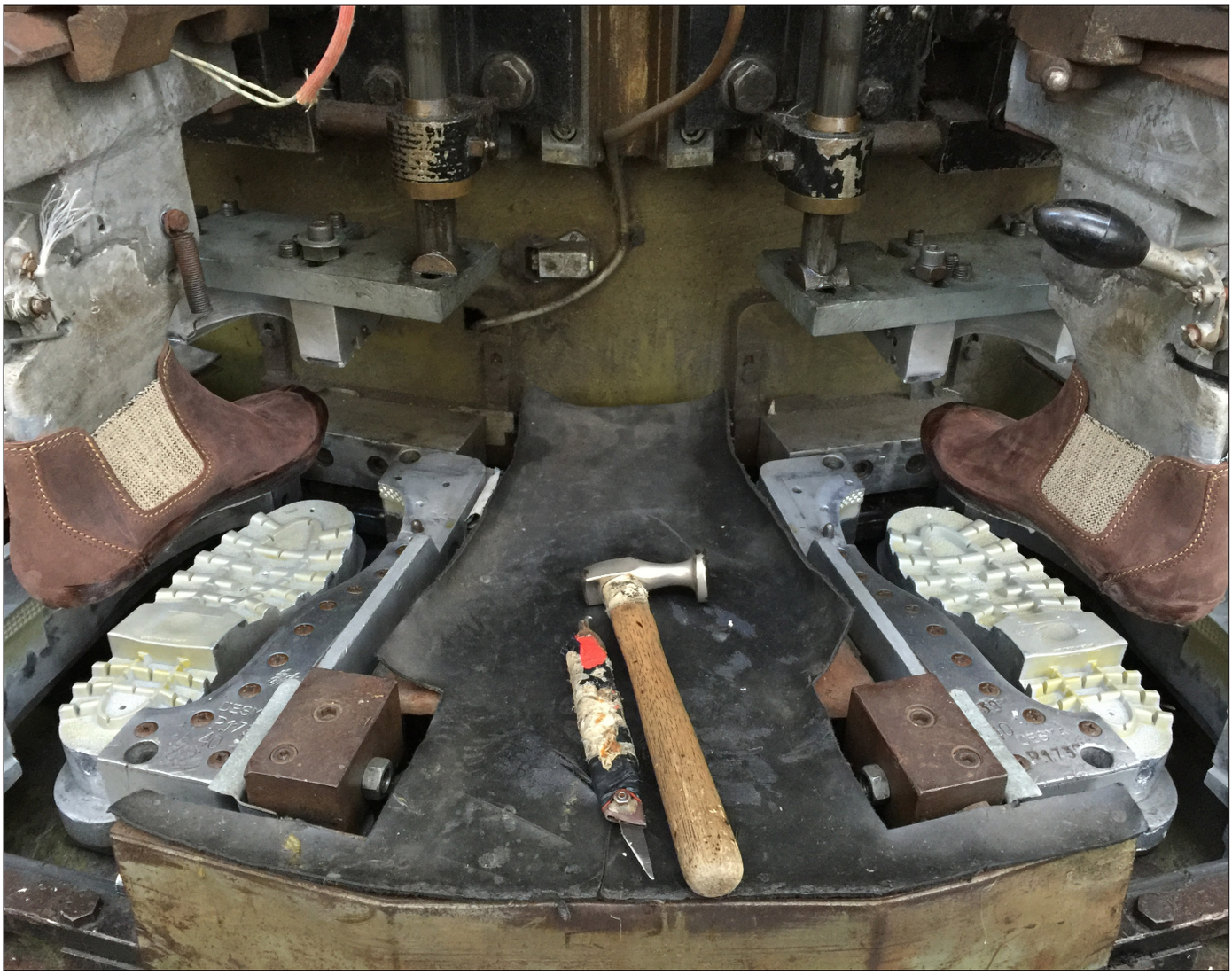


Figure 7.06 – New combinations of leather and textile were mounted on classic sole types

This was achieved in a number of ways. As iterated before, during the improvisation process, the heterogeneity of materials at hand technically becomes an ally for the improviser since it allows for greater flexibility in terms of admixing to arrive at suitable solutions. Here too, the available variety in the leather and textile stocks helped improve the prospect of offsetting limitations posed by the lack of sole mould styles and colours, and the inability to conceive newer upper patterns, by providing the possibility to fuse different material types adorned with a plethora of varied physical and cosmetic characteristics including colour, texture, prints, density, and stiffness. The said restrictions posed by limited sole and upper styles were negotiated through making atypical combinations between individual typologies of soles and uppers to arrive at unfamiliar but new permutations. Albeit, for the purposes of furthering effectivity, three particular upper and sole combinations were eventually identified as Iconic (Summer Time, Ténis, and Bota Militar), and became the basis for a bulk of the range. The atypical combinations, thereby, were considered directional for possible future implementation.

Figure 7.07 – The heterogeneity of available upper materials helped offset limitations such as the lack of styles and sole options

The core range was narrowed down to the above mentioned three styles in consideration of certain key factors, the first of which concerns their iconic value. The brand has been identified over the years particularly on the basis of these three popular styles, and thus they automatically become indispensable to any range which seeks to celebrate Cortebel's industrial heritage and legacy. Correspondingly, the introduction of fresh new colours, materials, and textures were applied to these styles, with an aim to reconceptualise their personality while retaining their essence.

Lastly, external possibilities were actively explored, with a view to effectuate further collaborations, partnerships, sponsorship, and networking, which could aid in the consummation, dissemination, and promulgation of this project along with the advancement of its objectives beyond academic research. This lead to a prominent interfacing with António João Gomes, and his research subject, Almalaguês, which is a Portuguese hand-weaving technique that possibly dates back to the 11th century (Gomes, 2016).

Figure 7.08 – A practitioner of the hand-weaving craft of Almalaguês

The technique and its subsequent production, the Almalaguês fabric, originates from the village of Almalaguês, near Coimbra in Portugal. Although the knowledge of this traditional art form has been kept alive through generations of weavers, Gomes' research indicates that it faces an uncertain future. The lack of formal studies and inadequate promotion over the years have meant that despite its cultural significance and creative potential, it remains largely uncredited. This in turn affects the craft in an adverse manner as current and newer generations are forced to consider subsistence through other, more lucrative means.

The Cortebel 50 project aims to address this issue through the production of an exclusive series of Summer Time footwear in Almalaguês fabric.

7.2 Cortebel 50 in Almalaguês

The utilisation of Almalaguês fabric represents a natural evolution of the Cortebel 50 project in several different ways:

1) The fabric exemplifies a wider scope of heterogeneous material that can be locally sourced and implemented in injected footwear manufacturing, thereby serving to develop a mutually serviceable ecosystem. Such cross-industry partnerships have historically been established at Cortebel, with regard to typical Portuguese industries such as Burel (wool and felt) and Teias da Lona (cotton canvas), however, this is the first time an association has been made with the Portuguese handicraft industry, and with a handloom material.

2) Since the Almalaguês fabric has been traditionally woven to make carpets, bed covers, and upholstery, the distinctly durable structure of the weave suits the requirements for constructing long-lasting footwear, and it is hence an appropriate alternative to the likes of leather, Burel or tarp canvas.

3) Since the associated hand-weaving industry is also in terminal decline, and the art form can genuinely be considered vulnerable (Gomes, 2016), a meaningful collaboration with the industry can aid in the sustenance of artisans, and in process, also maintenance the craft. This in turn corresponds to the core objective of any Designrascar intervention, which is to address real-world needs.

Figure 7.09
The initial samples were made from Almalaguês fabric swatches originally meant for António João Gomes' research inventory

Figure 7.10 – The variety on offer from Almalaguês gives the same basic shoe style perceivably different personalities

MSF
MSF

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Figure 7.11
Each style Almalaguês style bears the name of the artisan who produced the fabric

anabela rodrigues
alda
marcelino
Cortebel
SINCE 1965
REF.
COR
N.º

Figure 7.12 – Each artisan associated with the project was presented a pair of Summer Time shoes in the fabric which they produced

The import of the Almalaguês project into Cortebel 50 in this fashion signals an unusual collaboration in the context of Portuguese industrial legacy and heritage—the unprecedented hybridization of two vulnerable, distinct, and yet complementary vocations for the cause of mutual sustenance. For the Portuguese footwear industry, the intervention presents a new model of collaboration through its merging with artisanal crafts.

The overall design intervention at Cortebel, and specifically its consociation with Almalaguês weaving, has created different segments of impact. A cross-disciplinary platform has emerged from the process, benefitting the footwear manufacturer, the weaving community, and related industries in equal terms. Weaving looms have also been adapted unprecedentedly to fit the size formats of the Summer Time knife moulds from Cortebel. A selection of typical motifs has been made, which best represented the weaving culture of Almalaguês. These have been placed with precision according to the outline of the Summer Time design uppers. Placement and adjustment has also been done to accommodate the direction of the weave in accordance with the shoe pattern. For the Cortebel 50 series, a set of 23 different designs in Almalaguês have been developed in the form of prototypes.

Designrascar/Cortebel 50	Cortebel	Almalaguês
Situational Restriction	In financial decline	In existential decline
Limitations	• Limited workforce • Financial paucities • Ossified assets including machinery	• Limited market reach • Non-recognised heritage and potential • Adoption rate declining generationally
Nature of Available Resources	• Finite • Out-of-date • Heterogeneous	• Singular • Crafted manually • Antiquated
Opportunities	• Material heterogeneity aids admixing • Brand's keenness to experiment • Experienced workforce	• Novelty of handcrafted material • Variety in possible designs and motifs • Relative obscurity underlines uniqueness
Aspect of Improvisation	• Atypical material and style associations • Experimentation with sole material • Introduction of a suitable new material	• Unconventional application category • Technical adjustments for shoemaking • Combination with other material like leather
Real-world Impact	• New product ranges • Cost effective development strategies • New partnerships and business opportunities	• New market for application • Local and international acknowledgement • Key new partnerships and business directions

Figure 7.13 – Designrascar/Cortebel 50 project map

Figure 7.14 – The project has also generated interest in terms of design and marketability, which it has to consider as a future direction for the sustenance of the related crafts and artisans

A network has emerged which can potentially sustain the craft: different entities such as the community of weavers represented by the local association; industrial workers and partners; the Portuguese council for arts and crafts; and administrative authorities. Such aggregation has been made possible primarily through a design intervention within an academic context

(Almeida, Chatterjee & Gomes, 2017)

Figure 7.15 – The Cortebel 50 project has established networking between related industries, academic institutions, and local associations, which has the potential to be mutually beneficial in the long term

Critically, an overdue acknowledgement process and dissemination of Almalaguês weaving has been undertaken through its incorporation in footwear, which represents a non-traditional product segment for this craft, but works to leverage a broader interest in it. This project possibly represents a new benchmark for projects linking design and crafts in the Portuguese context, and pioneers the approach to Almalaguês

(Almeida, Chatterjee & Gomes, 2017)

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9
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Discussion

If the eventual goal of knowledge is to become common sense, then it is Designrascar's design to return the favour

Designrascar as an alternative model or approach of creative creative engagement is not envisioned to replace current industrial and academic standards and practices in design. It is rather positioned to augment these instead, which it seeks to achieve in a number of ways. First, and foremost, it acknowledges the existence, extensiveness, and effectiveness of the improvisational creative process that is different, but noticeable in plain sight, and has not been considered traditionally within the ambits of design. As discussed earlier, there have been isolated studies conducted in the past by noted academics, such as Claude Lévi-Strauss in philosophy, and Joseph Schumpeter in economics. Numerous spin-off philosophies have also emerged, and garnered attention, such as frugal innovation The research views these as isolated events, but symptomatic of a much larger underlying eventuation, that is yet unheralded, especially by design, as a natural form of creativity. This eventuation, which the research is promoting as an overall ethos, is a valid subject of study since it consciously or subliminally permeates our cultures and daily actions. Unlike other, more established creative persuasions, this form of design does not have any criterion for qualifications, and its practitioners are fundamentally not separated from the masses. It is a creative culture which can be considered 'by the people, for the people', because there is truly no scope for discrimination, in light of the infiniteness of possible application scenarios.

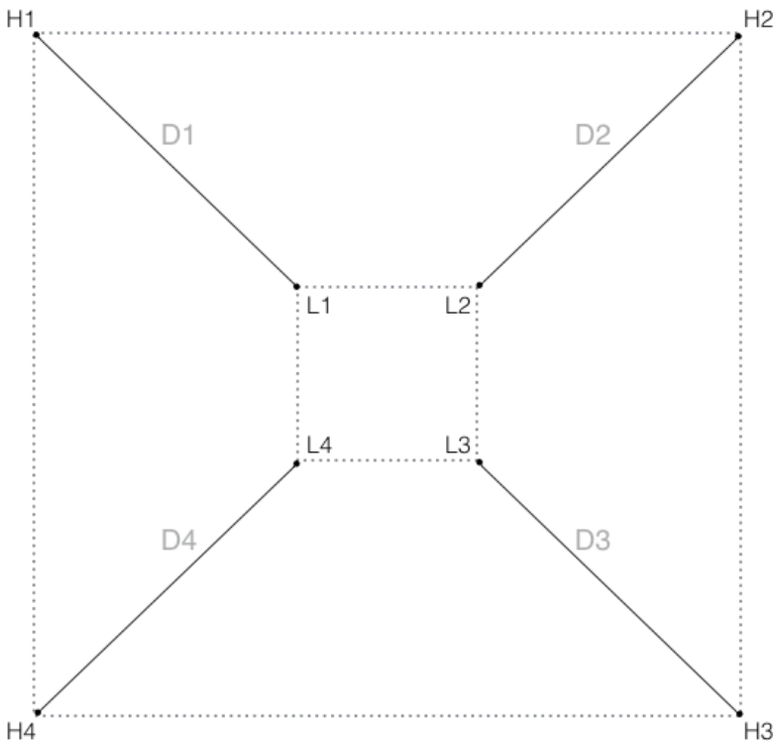
The associated approach is also observed to oscillate between being 'Plan A' to being 'Plan B', or as its parlance is in French, '*Systéme-D*', which basically connotes a setting of 'when all else fails'. This kind of jargon is also a reflective of a societal distrust towards the phenomenon, which is evident from its reception in different cultures, such as in Brazil, where *Gambiarra*, although rampant, is still viewed antagonistically. This is clearly a situation of paradox, because the practitioners of improvised problem solving respond naturally to a given complication, by trusting their own instincts and utilizing their inherent mental faculties when all else does 'fail'. The argument in this regard is that if such ingrained creative agency can be relied upon in the most dire of circumstances, then it also qualifies as a default option for the generic activities of design. The resorting to improvised action by no means marks a civilizational breakdown, but veritably gets amplified in situations of extreme duress, such as acute poverty, war, or natural disasters, because it is in such situations that human ingenuity shines with real purpose. These situations are a true test of applied creativity, and stretch boundaries of related understanding. The ingrained resourcefulness, determination and sincerity in these efforts should be perceived by design as a boon for addressing challenges in the foreseeable future where the intensity of resource limitations may effectuate the necessity for a tectonic shift in the creative outlook.

Situations of great adversity, how much ever resplendent they may be at highlighting the features of the said creative process, are by no means cloistered. Everyday complexities, such as temporary unavailabilities, are considerably smaller in scope, but also bring about improvised reformative actions that are equally vigourous, in terms of dexterity and efficacy. Designrascar recognises this aspect, and its inherent positives such as adaptability and mindfulness, in proposing an alternative model that can be of use to design academics and enterprises alike, for extending their repertoire of competences.

The plan thus for Designrascar to emerge as a potential accessory to Design in facing the prospective predicaments, centres around its three vital claims of contribution — in theoretical knowledge, practical knowledge, and tacit knowledge – which also form the resultant output of this research. Each of the outputs have been discussed individually in their respective chapters, however, it would be pertinent to conclude them in such tripartite manner, in acknowledgement of the multifaceted nature and applicability of the subject matter.

Research Outputs

Sequentially, the first theoretical contribution of this research is the development of the Improvisation Rangefinder tool, which has been used by the research to assess and compare different individual acts of improvisation. This tool is effective in gauging the overall scope of an improvised activity, irrespective of scale. Its development entails the instituting of criteria, that has been accomplished with the establishment of four major determinants as structural parameters. These parameters have then been converted into four sets of scales with higher and lower extremities that determine the extent of individual aspects, such as levels of urgency, and provisionality of the solution. These four sets of scales are subsequently incorporated into a single figurative plat that provides a graphical synoptic of the scope, that is plotted through markers along the scales, upon assessment.



Improvisation Rangefinder

Furthermore, the Improvisation Rangefinder helps construct the consequent theoretical feature of the research, which is a taxonomy of improvised action. The taxonomy is attained through distinguishing similarities in graphical patterns on the Rangefinder. The sample size of 75 distinctive acts of improvisation proves sufficiently directional, however, the research during its course has managed to collect 500+ examples, with continuing additions, from which the sample size represents a small but variegated selection, made intuitively. The overall extensiveness of the subject does prove a boon to areas of the research that argue its mass-scale percolation. However, for the precise reason of maintaining the research within its spectrum of objectives, only the most apparent persuasions of improvised action have been noted, and the research's limitation in enumerating further divisions is acknowledged. The established agglomerations – improvisation in emergencies; cultures of improvisation; and improvisation in business and social entrepreneurship – as further theoretical contributions, enlist the three most commonplace avenues where techniques of improvisation are employed.

The subsequent theoretical contribution emerges from one of the above identified agglomeration, cultures of improvisation. The research is able to establish 14 different cultures of improvisation spread across five continents, as Cultural Complexes that have a common improvisation-based underlying narrative, in accordance with which the research proposes Everyday Improvisation to be considered as a Cultural Pattern. This theorization is unprecedented.

Consequently, the analysis of the commonalities in each agglomeration of the previous segment paves way for the central theoretical objective of this thesis, which is to identify the common vectors of improvisation in restrictive circumstances. The thesis respectively identifies 4 acts of improvisation that populate the procedural aspect – acts of Prioritisation, Reinterpretation, Reorganisation, and Iteration.

Within the act of Reinterpretation, the thesis introduces its first practical output, the Pencil Exercise, which forms a quick-paced workout that helps orient students and audiences to the theme of spontaneous creativity, in thought and action. This exercise itself has generated over 700 responses, that have as yet only been analysed for repetitions, but which potentially hold more depth in terms of information relating to, for example, the psychology behind the distinctiveness of approach.

The thesis also identifies vectors that populate the incidentally occurring dialogic space between the improviser and the circumstance. These are: the nature of tools and resources; the roles of critical and creative thinking, stress and survival instincts, and knowledge and intuition; and finally, the characteristics of the end solutions, all of which help determine the conceptual causality behind the phenomenon. These 5 vectors along with the previous 4 acts mentioned before, cumulatively aid in the deconstruction of the creative process within an act of improvisation.

The practical components of this thesis concern the initiation of Designrascar's research into practice. This is achieved in two ways: one through pre-designed exercises that urge the participants to behave in the manner of an improviser while ensuring certain non-negotiable objectives are met; and the other, through direct application of Designrascar's philosophies in a real-world setup.

Contribution to design — In discussing the real-world setup first, Cortebel 50 proves an excellent platform for showcasing how exactly Designrascar philosophies can make an impactful contribution to design. The first attribute of Designrascar that comes to light with the initiation of this collaborative project, is mindfulness, which continues on to other aspects, correspondingly. However, mindfulness is displayed at commencement, where comprehending a particular situation to be eligible for an eventual implementation can prove equal, in terms of gravity, as finding a solution. Designrascar, in collaboration with Brand Archives, discerned facets of Cortebel, whose amelioration through improvised reformative action, could help combat its design related predicaments.

The second attribute concerns the application of previously gained knowledge in a constructive, hands-on, and fast-paced way. The researcher has substantial experience in the design and retail of footwear, however, it is not the experience itself, but its manner of implementation, that provides further cues on how Designrascar can augment the creative process also of established design ventures. Unlike in the traditional system of footwear design, there was no affordance for any extended period of research and development. The design scenario itself was completely unconventional, because there was no budget, no pattern masters, and no scope for client boards, mood boards, or technical specification sheets. The design process for the Cortebel 50 range had to be spontaneous.

What came to pass as a result, was a clear manifestation of Designrascar's philosophy to be mindful of opportunities, and accordingly, to be readily adjustable. This is where the tacit knowledge of the designers with regard to colours, textures and forms came into effect. Since the only resources initially accessible were all in-house, the combinations of materials, trims, and threads had to be determined on the fly. Also, the research had to be mindful of the ongoing production, for being able to fit in equivalent styles in continuation. This would save on both time, and occasionally, the use of resources, because the respective articles, for example, would have the same combination of style and size, or sole style/material/colour.

Thereby, a constant dialogue with the prevailing environment becomes apparent, wherein opportunities of incremental betterment were gained by keeping a finger on the pulse of the proceedings.

Another feature of the Designrascar approach is to seek favourability from limitations. In Cortebel 50, this can be gauged from its use of materials for uppers and soles. Where as in the usual design process for footwear, a lack of season specific state-of-the-art materials can prove debilitating, for Cortebel 50, the existing stock and its heterogeneity instead was recognised as sufficient enough to create newness and offset this issue. Also, in the absence of variety in sole styles, decision was made to give clear priority to the three most classic styles and explore their potential beyond currently perceived value through experimentation with more premium upper materials such as leather, Burel, and later, tweed and Almalaguês. This decision to stick to classic styles also had other related benefits. Since these styles were the proverbial bread and butter, as being most produced by the company, Cortebel 50 automatically gained the required continuity to be a celebratory range. It was also easier on the production process since the workers were most adept and comfortable with working on these styles. The moulds and the knives were also readily accessible, and in good condition. Often, the injection machines did not require to be set up anew. Even the most commonly available boxes fit. Overall, instead of capitulating to limitations pertaining to materials and processes, Designrascar spontaneously identified aspects of the issue, which, with a bit of deliberation, proved to be excellent impetus for deliverance.

The Cortebel 50 project, through its integration with Almalaguês, as iterated earlier, is maturing to become an impactful initiative that can potentially help mitigate some of the uncertainty concerning the future of Almalaguês and Cortebel. Its priority is to maintain the crafts as a steady source of sustenance for the artisans and the workers, with a view to gradually increase personnel. The project also engages the worker and artisanal community, by the simple act of acknowledging their contribution to the industrial and cultural heritage of Portugal respectively. In case of Almalaguês, the project is keen on consolidating a largely unorganised sector into a well-organised cooperative. Culturally, the project aims to provide a long-term solution for sustaining the legacy of Almalaguês through the identification of alternative roadmaps alongside footwear, which is already a new market application for the fabric. Overall, the project has taken strides towards creating and expanding academic and business networks for mutual betterment. In the near future, it seeks to streamline production, and develop high-value propositions that can help the respective cultural/entrepreneurial entities to improve their financial positions. The project has been presented comprehensively for the first time to international audiences at ‘Intersections’ conference by the Textile Design Research Group at Loughborough University, London, in September 2017.

The other major practical output of Designrascar, as iterated before, is the exercise model for design education. The model is highly customisable, as evidenced from the various complexions it has assumed during the course of the research, in order to both incite, and understand improvised creativity. It uses unconventional settings and situations to take the participants out of their comfort zones, in line with the proverb, “A calm sea does not make a skilled sailor”. It can also prove instrumental in inculcating a habit of questioning the material and physical properties of resources, especially in the field of product design, which helps in resource optimisation and/or maximisation.

Relatedly, the tacit output of Designrascar concerns the possibility of it being introduced as an

auxiliary module in design education. Although improvisation is a natural response, professional improvisers in alternative fields such as jazz music, elocution, and stand-up comedy stress on it as being a form of self expression that can be bettered with practice. The same has been verified through Designrascar's own experience of working with students, whose initial stages of hesitation were regularly replaced by exuberance, as they gradually got a measure of the task at hand. Thus constant practice is key to becoming a better practitioner of improvisation, since the shift in creative outlook is much faster and smoother, or as Pasteur says, "chance prefers a prepared mind". The workshops garnered positive feedback from all the design educators they were held in conjunction with, and the research remains open to future possibilities of collaboration.

To conclude, this thesis proposes an approach to a territory that is unexplored by design as an alternative creative culture, and which can provide grounding for the future, both in terms of research and application. For research purposes, creativity that stems from constraints is a new and valid study area that design can consider in order to harmonize with changing fortunes in resource availability, and adjust with situational challenges decisively without losing sight of core objectives. The thesis highly recommends further neurological inquiry in what it appraises as an ancillary branch of creativity that can practicably contribute to the overall neurological understanding of human ingenuity. In regard to application scenarios, the research sees design education at all levels potentially benefitting from the unorthodoxy which current or future Designrascar challenges may present. The overall discourse on improvised activities can gain from the Improvisation Rangefinder tool to discern individual scope and denominations. With respect to real world applications, the concomitant approach is already authenticating its serviceability to restrictive situations, along with providing new evidence of its ability to integrate seamlessly with projects, initiatives, and pursuits that are recognisably unconnected, but collude to solve common temporal needs.

Designrascar's system is one that is channelled by a deep-rooted respect for imperfection, however it manages to capacitate itself through accepting error as an inherent component of the emancipation process. In this lies its propensity to overcome apprehensions of a restrictive situation, and become conducive to receiving inspiration beyond previously understood thresholds. In a world fast moving towards untenable equations between resources and demands, such line of thought can prove to be ground-breaking.

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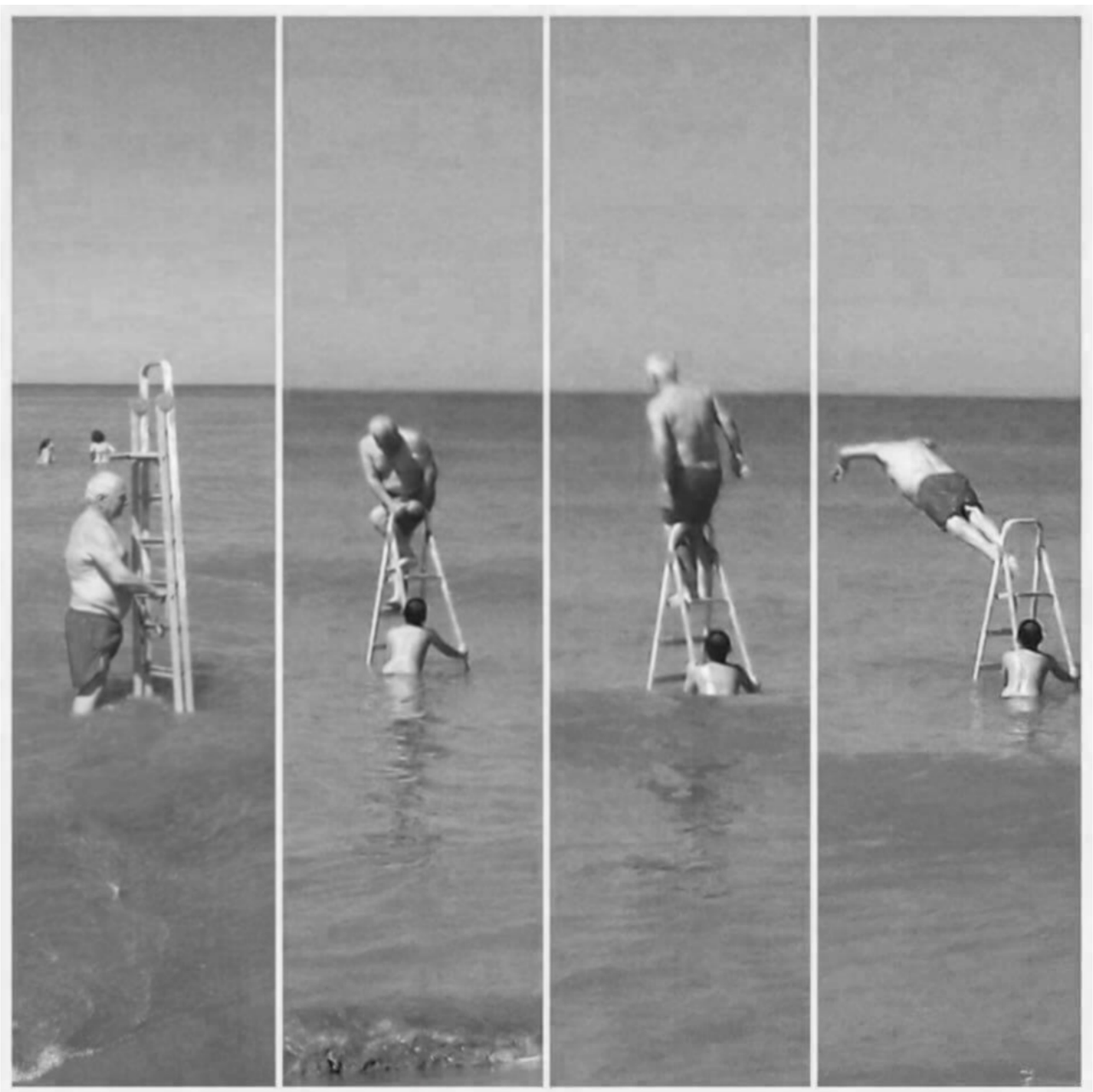

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