



Do It Yourself and Improvisation: toward one another epistemology of design. Bruno Massara Rocha

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ABSTRACT

This paper discusses Do It Yourself practices with consideration in its most important action strategy: the improvisation. It will be demonstrated that the notion of *to improvise*, as a creative action, transcends substantially the values assigned by the common sense and design culture. Initially, the attributes of improvisation will be presented from the artistic point of view. Then, these attributes will be confronted with action-centered design methodologies regarding Donald Schön's *reflection-in-action* theory. Based on the notion of improvisational knowledge, it will be disclosed a detailed analysis of the nature of Do It Yourself behaviors and procedures, in observance of its most significant movements such as the Maker Culture and the Open Design. The paper's intent is to argue that improvisation is an extraordinary creative procedure apt to be systematized and incorporated into contemporary design processes. We believe that improvisation conveys the potential to review contemporary design towards one another epistemological perspective.

Keywords: Improvisation, reflection-in action, epistemology, methodology, Do It Yourself.

1. INTRODUCTION

One of the most recurrent expressions attributed to Do It Yourself practices is improvisation. This paper's central purpose is to elucidate what really is the improvisational process about, and identify what kind of relations exist between improvisation and Do It Yourself practices. We intend to share a methodological analysis of the improvisation process and demonstrate that many superficial visions involving improvisation overshadows several qualities of this act. Improvisation is recovering today an important value as a democratic resource of knowledge applied in project development.

In order to define improvisation properly as a process it is indispensable to retrieve its original definitions from the artistic field. In the arts of the 20th century, improvisation is one of the most important qualities of openness and self-expression. It was in the 1960's avant-garde that the concepts of participation, autonomy and appropriation became solid, unfolding and influencing Do It Yourself architecture and design movements. In the same period, several design research groups such as the *Design Methods Group* started to discuss and investigate less deterministic design methods based on complexity, emergence, spontaneity and adaptation. These methods were dedicated to creative experimentation beyond scientific thought. Donald Schön, a researcher and professor at Massachusetts Institute of Technology (MIT), introduced a seminal model inspired in part by creative jazz processes and titled *reflection-in-action*. The Schön's model has fundamental concepts that allow to deal with improvisation into the design practice. Its most important arguments are oriented by the fact that the foundation of design reasoning is based on intuitive knowledge and on feedback cycles between learning and doing, reflecting and acting. Schön's theory is a glimpse to another possible epistemology of the design process, in which it is viable to articulate improvisational procedures, integrated with the creative and reflexive design strategies.

The author believes that it is not only feasible, but also desirable that all professions involved with organizational tasks have flexible and adaptable appreciative systems. They must incorporate abductive thinking, experimental thoughts and tacit knowledge, just like musicians do in jam sessions. To Schön, improvisation, as played by jazz musicians, is an extremely relevant process of adaptation focused on ascending innovation and collective construction. In a jam session the artist is always producing new meanings from existing vocabularies. This sort of improvisational behavior can also be identified in trends of the Do It Yourself culture, such as: the Maker culture, FabLabs, HackLabs, Open Source programming language, Open Design and the Creative Commons policy. Our interest in studying improvisation methodologies in the design context is supported by an emerging awareness driven by a flexible and experimental design thought that recognizes the limits of traditional design reasoning. Contemporary design thinking is looking for original strategies to incorporate the immense variability of computational languages as a vehicle to transform architectural practice.

2. IMPROVISATION ATTRIBUTES

2.1. A broader view of improvisation in art

Improvisation is a process closely linked with praxis and, despite traditional ideas of an "uncommitted action", it demands a conscious and technical domain of the dimensions upon which one improvises. It has a paradoxical relationship with technique: it depends on it and at the same time seeks to transcend it. In this paper, we will address a broader conception of improvisation: it is an effect

resulting from an open and experimental artistic action, and committed with indeterminacy, relational stances and creative action spontaneously made. This conception is supported by the theoretical contributions of Daniel Belgrad (1998) and what he calls "the culture of spontaneity in art" (Belgrad, 1998). It embodies artworks associated with an existential involvement with action, practice and gestural performances. Important references of improvisational reasoning in the 20th century arts such as Jackson Pollock, Miles Davis, John Cage, Merce Cunningham, Andy Warhol and Hélio Oiticica can be highlighted into this culture. They are essential members of the evolution of a free creative thinking in art. One of their main motivations was the exploration of emergent behaviors and formations as a strategy to get involved with indeterminacy, chance and uncertainty. We identify in this generation attributes of improvisational behavior such as flexible and malleable structural frames that guide, but do not define the way its relations will occur.

2.2. Openness and sharing in artistic work

Andy Warhol produced in 1962 a series of paintings titled "Do It Yourself" (1962). In these paintings the artist partially depicted classic motifs such as still life, flowers, landscapes and boats. However, he intentionally left the paintings unfinished suggesting that from that point on, anyone could potentially complete them. Into the unfinished spaces of the picture he left subtle marks and outlines with fill instructions, like paint-by-numbers hobby kits, a form of reference to orient external intervention. His series of unfinished paintings reflects, in a subliminal way, his intention to subvert the authorial and centralized model to produce art, trying to propose another creative model inspired by anonymity. Warhol blurs the classic notion of authorship and indirectly points out to the effacement of the subject in the industrial mass culture society. He signed a trend that would accompany the work of several other artists post-1960: the loss of control over their own productions. Sharing the creative act with the audience is a feature that can be understood as "second level openness" (Plaza 2000), and implies transferring to the audience part of creative responsibility. From that point on, the audience becomes part of the work, inscribing themselves into the piece not only with their eyes, but also with their gestures and their body. The dialogical relation between the artwork and public is a key element to produce cycles of improvisation in the arts.

2.3. Hybridity of references

Another important attribute of improvisation in the arts is its ability to hybridize material and immaterial cultural references. It means that improvisation does not arise from "nothing" but from recombination and rearrangements of existing vocabularies, in many cases conflicting. Ingrid Molson (1996) explains that improvisation is not randomness, arbitrariness and incoherence. Instead, it is "coherence through contradiction" (Molson 1996). It is the capacity and also the necessity in articulate references from different sources, combining them into new narratives, situations and fresh paths of meaning and use. The improviser has this sagacity to appropriate available cultural elements, reinterpreting them and performing what Michel Certeau defines as acts of "micro piracy" (Certeau 2011), or what Nicholas Bourriaud calls "post-production" (Bourriaud 2009). Marcel Duchamp is a pioneer of improvisational hybridity. His Ready-mades are noteworthy examples of the artistic ability to appropriate and establish meaning displacements in the primitive elements that founds the artwork. The act of hybridize creates new plot lines to existing elements and reinvents singular trajectories within the culture by using its own references and its trivial vocabularies. The hybridism inaugurates a disruption with the novel, the sublime

and heroic, and thus introduces a sort of improvisatory and open reasoning. Improvisation is surrounded by the ability of reprogramming just like DJs and programmers do: to appropriate, to concatenate, to relate, to remix, to sample, to hack and to subvert.

2.4. Collective Agency

We can name a third key attribute of improvisation that is the collective agency. The collective agency is associated with the ability to coordinate collaborative creative processes. The idiomatic improvisation, also known as matrix improvisation, is based on underlying rules and structures that coordinate and orient the sequences of expression in a group formation. These structures are embedded within collective jazz performances such as jam sessions. Mixed into the jams, they sustain the internal coherence of the performance even under successive variations, and ensure its continuity and evolution. A jam session is a specific mode of open and dynamic system, which has internal orderings able to reprogram and redefine themselves continuously as long as the performance evolves. Liz Danzico (2010) explains that the emblematic album *Kind of Blue*, by Miles Davis, was recorded using a matrix system called modal jazz. The modal jazz system had independent and open orderings that fomented new chords and progressions beyond what was done in Bebop and Hardbop. The author describes modal jazz as a process with less relation between chords and harmony and more connection between chords and independent modal scales (Danzico 2010). Different from the central and unique harmony, the modal scales could vary freely while sustains the coherence of the whole music. The result was structurally simple music, less chords, but much more autonomy to adaptation, variation and improvisation.

Analogously, the modal jazz allows the understanding of how the design of a matrix system enables the agency of collective creative processes, offering autonomy to each subsystem to develop its own expressions, without losing the internal coherence of the system as a whole. The open matrix system promotes a model of interaction that goes far beyond the interpretation of music scores. It opens possibilities to individual expressions and the manifestation of personal experiences and repertoires. The musicians trippingly release their own grammar throughout the performance. Thinking and acting are directly engaged in matrix improvisations and both sustain a subjective feedback loop of invention, expression and reinvention. Modal frames create a dialogical interface among all involved into the process of improvisation.

The notion of matrix systems and frames of reference are the connection between improvisation and contemporary design process. The concept of frames is used into methodologies and discourses of design processes, and its purpose is to develop more open projects based on direct action similar with Do It Yourself.

3. A NEW VISION OF IMPROVISATION IN DESIGN CULTURE

The concise understanding of improvisational attributes in art offers a new perspective from the prejudiced view of something unstructured, poorly made, inconsistent and low quality. The artistic field proves that acts of improvisation require preparation, technical expertise, frames and a continued reflection. To improvise it is necessary to have context consciousness, vocabulary and repertoires that can be retrieved in real time and in a spontaneous and intuitive way. It implies tactical and adaptive action in situations that demand resourcefulness and ability to overcome problems, limitations and restrictions. The improviser works in situations of risk, instability, and uncertainty, with restricted space to maneuvers. He tries to

establish temporary agency solutions and create flexible resolutions apt to reconfiguration. Improvisational is the ability of a given system to assume different configurations without sacrificing its initial design.

3.1. Do It Yourself and improvisation

The Do It Yourself culture operates under similar conditions and frequently finds in improvisation a way of articulating its challenges. When we "do by ourselves", using our own resources and abilities, we take the advantages and also the risks of the informality of this choice. For example, the proposition *Do It Yourself Living Structures* devised by the architect Ken Isaacs offered to regular people an alternative to build their own houses. In order to do that they should strive to "put your hands dirty", said the architect (Isaacs 1974). This proposal was initially conceived as a handbook of constructive information or a simplified technical kit. It was based on regular techniques, conventional and easy-to-use materials, well adapted to the logic of garage workshops. Besides proposing an economically advantageous alternative, *Living Structure* encouraged the personal engagement of its users with manual labor and with a new sensitivity of experimentation, invention, practical action and collective work. Isaacs was inspired by critical visions of American's over-consumption and over-efficiency culture which forced people to indebtedness and to the role of passive absorbers of an idealized life standard (Isaacs 1974).

Living Structures influenced contemporary Open Design initiatives such as *Open Structures*, by Thomas Lommée, a Belgium architect responsible to articulate an online platform intended to create a horizontal network of collaborative and shared design components. *Open Structures* offer autonomy to the configuration of personal projects through free distribution of 3D files for rapid prototyping directly to end-users. It is a feasible option to disentangle from the market monopoly and high taxes. *Open Structure's* process features improvisational qualities with lower operating costs and higher individual engagement. Individual production is shared with all other users and therefore creates a dialogical database of references and collaborations.

The Open Design movement, to which belong Thomas Lommée, Ronen Kadushin and Jeans Dyvik, takes advantage of digital platforms to subvert the dominance of standardization and specialization of industrial culture and offers alternate paths for users to avoid the pitfalls of mass consumption, rampant inflation, signature designs, fashion appearance and culture. At the same time, it is a possibility to users to incorporate by themselves value and quality to personal objects and environments. Open Design works in favor of the exchange of information between architects, designers and inventors, allowing different groups to share ideas and projects into an improvisational and cyclical network.

3.2. Learning by doing

Do It Yourself practices are gaining significant importance in the production of contemporary design knowledge. They are becoming a truly and energized field of improvisation. Shared projects are generating new reprogramming tactics that can be identified in several websites such as Instructables, Makezine, 123Dapp, and Thingiverse. It is consolidating a culture of downloading, sharing, informal learning that requires new design knowledge, which include abilities to adapt, hybridize, share and take risks. In practical terms, it is a process that brings together creators and users, and makes possible a closer and direct experience with prototypes throughout hands-on and learning-by-doing processes.

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The expansion of a network of digital fabrication laboratories (FabLabs) encourages knowledge distribution and laterality in the process of creating and producing many types of equipment, objects, electronic systems and devices. Common practices in the FabLabs are the Fabjams. Fabjams are events inspired by jam sessions, getting together professionals and amateurs, in person and over the Internet, and exercising collective improvisation in the design of ordinary projects. In a few hours all involved must be able to produce physically feasible solutions to specific problems, treated as *themes*. The Fabjams subvert the linear order of traditional design processes, implementing cyclical progressions of reflection-in-action, not providing enough time to representational or notational tasks. From initial ideas there is a direct jump to building prototypes. The alternation of ideas and prototypes establishes a recursive cycle of improvements via subsequent versions of the same idea. There are no defined hierarchies. The process flows over the redefinition of patterns and evolves in accordance with the original proposal. Broadly speaking, the final result is as important as all partial moves employed to achieve it. This is due to the richness of the sharing, the exchange of experiences, the learning by doing knowledge, and the social engagement constructed.

Indeed, we witness a cultural moment of convergence of new creative instances in design process, which assume informal settings and presents significant results for one other epistemology of design. The ability to improvise is a demand for this moment of openness and sharing knowledge. Contemporary designers are now required to operate increasingly complex, heterogeneous and dynamic contexts, and to face new problems-settings for which there are no given answers. It is necessary to design adaptive framings and interactive formations more tuned with users and contexts. Architects and designers must acknowledge the limitations in traditional education of design and transgress rigid planning models. They must acquire a reasoning ability of deep reflection-in-action, which we call: improvisational thinking.

4. REFLECTION-IN-ACTION: A METHODOLOGY FOR IMPROVISATION

The reflection-in-action model proposed by Donald Schön is an important methodology to structure the improvisational thinking because of two main aspects: first because it is an action-centric model which considers that, in the design practice, knowledge is *in* our actions. Even when we make conscious use of scientific techniques and theories its application depends on a tacit knowledge and personal skills (Schön 1983). The know-how, understood as a set of internalized knowledge we use *priori* to action, is considered by Schön as well as by Nigel Cross, John Naughton and David Walker (1981) as something that frequently subverts given rules and finds sudden, accidental and spontaneous paths to the solution. The improvisational thinking corresponds to the same reasoning: it is an anarchic process that transcends pre-established rules and obeys individual action patterns from the improviser. Second, frame's coordination is common both in matrix improvisation as well as in contemporary design processes. Frames orient the entire course of a reflection-in-action process. According to Schön, frames are initial programmatic orderings conceived by the designer or by the artist to synthesize relatively autonomous lines of action. These frames serve as a matrix that guide, but not determine how reflection-in-action develops. Frames have systems of implications in-between its lines of action that organize the evolution of process variations without losing its internal coherence. Similarly, matrix improvisational processes respond to the same type of ordering and behavior. Subjacent frames define benchmarks in order to sustain the congruence of sequences of variations.

4.1. Framing complex problems

The use of matrix orderings is part of design methodologies dedicated to investigate strategies to complex problems. Complex problems are characterized by vagueness of its conditions, uniqueness of its articulations and absence of previous resolutions. Also, they lack conventionalized criteria to objectively decide the better solution (Schumacher 2012). Its untamed configuration defies the pure rationality of design processes and makes it impossible to directly apply codes, rules or globally set principles. Schön argues that it is necessary deploy dialogical processes with problem-settings in order to give proper responses to complexity scenarios.

The meaning of framing in design processes deal with the formulation of initial schemes of problem-settings based on primary hypothesis and assumptions. With these schemes the designer starts subsequent moves to adapt the problem to the framing. Each move to adaptation is succeeded by moments of critical reflection when the designer analyzes and evaluates the immediate consequences of his moves. This process assumes a spiral trajectory. The designer always takes a step back to plan the next move in gradual upgrading complexity. New and unpredictable feedbacks are always emerging from the problem situation, and this is a default in complexity. On that account, the initial framing scheme is subject to constant reconfigurations. The agency of the complex problem faces indetermination and uncertainty, and the designer must have some strategic improvisational skills to deal with the unknown.

The reflection-in-action's reasoning patterns have a fairly experimental nature open to chance and indeterminacy, and for this reason distinguish from the nature of scientific thought. The independence of the nature of design knowledge from scientific rigor is an important matter to ponder improvisation as a tactic of articulation and adaptation in design processes. Nigel Cross explains that the design method uses different types of organized knowledge and the scientific knowledge is only one of them (Cross et al. 1981). The theoretical position of the author is that design is a technological and purposeful activity, which occurs, in an organizational context dedicated to the creation of "new things" instead of the analysis of "existing things". On the one hand the scientific method is an analytical behavior oriented to identify and determinate the nature of existing things. On the other, the design method is a productive behavior employed in the invention of what doesn't exist yet or add value to something already produced (Cross et al. 1981). Edgar Morin and Jean-Luis Le Moine (2000) describe how deduction and induction are the underlining pillars of determinism and scientific knowledge. Deduction is based on the formation of conclusive analysis from preliminary assumptions and propositions and induction, conversely, analyzes particular and individual facts in order to formulate more general principles (Morin & Le Moigne 2000). However, besides deductive and inductive reasoning, design processes demand a third type of reasoning: the abductive reasoning.

4.2. Abductive Reasoning

The abductive reasoning has similar aspects with the technological-purposeful design attributes. It is associated with creative and inventive behaviors rather than conclusive ones. Its goals are to add value to existing situations and to appropriate and incorporate contextual available elements in order to promote renovations and reconfigurations. The inventive nature of abductive reasoning is congruent with improvisation processes. The idea of appropriation, analysis and reconfiguration is a reflection-in-action cycle present in both cases. The abductive reasoning is also a central aspect of contemporary design methodologies like Design Thinking.

According to Kees Dorst (2011), the Design Thinking is dedicated to study updated strategies to deal with complex and wicked problems in contemporary mode of organization. One of the bases of Design Thinking is to investigate new mechanisms through which designers can create frames and flexible orderings to complex situations (Dorst 2011). These are very similar reflections to Schön's theory. He has the same theoretical position about frames as sets of reference, relations and implications that allow the designer to describe initially a problem situation suggesting operative principles to reprogram and add value to it. Just like improvisational processes, as long as the cycles begin, new and unpredictable relations keep occurring continuously over time requiring adjustments and adaptations. In other words, frames are operative principles defined by a network of implications that orient how a given relational system adapts over time.

The abductive reasoning can be defined as a divergent, situational or local reasoning. It overcomes the idea of composition by the agency, and is dedicated to coordinate singularities rather than building them separately. Implies a process of continuous rearrangement and adaptation, test and applications, analysis and partial evaluations. The cyclical nature of abductive reasoning is nurtured by framing schemes and recursive reflection-in-action. It involves a process of hybridization of forms rather than error suppressing.

4.3. Action-centered thinking

Do It Yourself practices have an inseparable relationship with practice. However they do not refrain from theory and research. At the same time, do not adopt blindly a concept that cannot be applied into a practical action. Henry Sanoff (2007) says that action-centered thinking adopts research as a conscious oriented to making. It is a methodology that searches simultaneity between understanding and transformation. Improvisation can be compared to an action-centered research. There is a dialogical condition encompassed by action, reflection, learning and valuing. Improvisation and action-centered research, each one in a different way, build connections between theory and practice, and reveal new perspectives to education and professional designers. Using Certeau (2011), improvisation, as an action-centered thinking, has a tactical nature, a trickery behavior, and takes advantage of circumstantial occasions (Certeau 2011).

Action-centered thinking is also a sort of game between hypothesis and results. The limits of this game are set by the logic of affirmation: when a move fails and brings unintentional consequences, the designer critically examines the implicit theory of this action, reorganizes the frames and creates a new consistent move. The learning sequence, initiated by the denial of previous moves, ends when a new theory drives to a new affirmative move (Schön 1983).

The maker culture is a symptomatic manifestation of action-centered thinking. Many complex prototypes have been building based on learning-by-doing processes. In the present days, the Maker culture is leaving the status of "alternative practice" and is becoming the engine for a new epistemology of design. We can identify sharing, informal and socially engage knowledge articulated on the Internet as tactics to innovation. The idea to adopt low-tech strategies explores economically restricted and aesthetically independent situations. Maker culture is deeply improvisational in its nature and tactics.

5. CONCLUSION

There are many contributions of Do It Yourself practices to contemporary thinking. In this paper we tried to elucidate methodologically how they are managed, which

orderings they use and how they agency the production of knowledge. The discussions these practices bring to design are vast and transcend the limits of this paper. There are epistemological and methodological issues extremely important to contemporary designers and also artists and amateurs. Do It Yourself promotes a new creative sensibility and recognizes the importance of tacit knowledge, hands-on activity, artistic and experimental investigation. It opens new perspectives to recycle, sharing, and doing-with-others. We can also point the effort to develop autonomy over serial production through the mutuality of knowledge.

The reflection-in-action model proposed by Donald Schön (1983) allows us to figure new methodological approaches to consider improvisation as an open design model that supports this new creative and productive condition configured by Do It Yourself behavior. The development of bottom-up and open source technologies summed with the evolution of digital fabrication and interaction systems demand one other epistemological design direction. The improvisational thinking is a contribution to this new sensibility and mentality. It can be adopted as a part of a culture based on shared experimentation and invention, which focus on local demands.

Vilém Flusser (2007) seems to agree with the improvisational thinking when he says that in the future all the people will be able to appropriate of existing things, transform and reconfigure it (Flusser 2007). Our relation with machines is profound and complex. We cannot not put ourselves in an uncomfortable position or let be dominated by techniques or devices. Instead, we must assume the behavior of the "photographer facing his camera", as points Flusser. The relationship between the photographer and his camera is similar to a game. The photographer must become aware of all tricks of the device, get inside it, merge with it and lost itself in the search for hidden potentialities. He must face the camera as a challenge. We must never play with it, but against it. After all, the best pictures are the evidences of the victory of photographers over the limits imposed by the camera (Flusser 2002).

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