Critical Design Practices for Sustainable Design and Its Evolution

Rosslan Lozev New Bulgarian University, Montevideo blvd. 1618 Sofia Bulgaria

Abstract

Design plays a main role in crating sustainable civilization, material dimensions of product design, architecture, industry, urban and regional planning, and the intangible dimension of concepts that play a role in sustainable development. Indeed, the imperative for more sustainable development requires a profound rethinking of the design.

The text explores Sustainable Design with a cosmopolitan charge, as it refers not only to the environment but also to the social and political environment. The work traces historically for designers and society as a whole. A complexity of dynamically work and analyzes critical design practices. The transition from "green" to "eco" and to "sustainable" design is a constant expansion of the scope of theory and practice and, to a certain extent, the ever more critical perspective on ecology and design. The aim is to present the development and interaction between design practices and sustainability issues, following a quasi-chronological model. I briefly present the Sustainable Design approaches, providing information on achievements and potential development guidelines for each approach. The ressarh aims to engage design researchers in a discussion on sustainable design, its development over the last decades and the future.

Keywords: Evolution; Sustainable Design; Critical Practices; Product Design; Design research.

Introduction

Ecological enlightenment is - the process and result of - 3.8 billion years of evolution. The history of evolution can be understood as a record of design strategies, as life itself in all its diversity has evolved through biological creativity. Design must play a central role in efforts to shape an increasingly sustainable civilization. These strategies will focus on the material dimensions of product design, architecture, industry, urban and regional planning, as well as the intangible dimension of concepts, and the inclusion of multiple perspectives from which a holistic, integrated worldview can be achieved.

As a liberal art, design is a discipline that synthesizes knowledge from all the natural and social sciences and applies in to solve complex technical and social problems. These dimensions of design are evident in its expanding role in sustainable development, including its role, for example, in expressing product life cycle information, changing energy consumption behavior, rethinking transport or food services, and steering decision-making processes. Being based on critical research and critical art and design practices, it is inspired by critical theory and political philosophy. These fields open the discussion on the role of design in sustainable consumption and sustainable communities in which ecology is deeply involved.

Material and Methods

The aim is to present the development and interaction between design practices and sustainability issues, following a quasi-chronological model. I will therefore briefly present the main Sustainable Design approaches, providing information on achievements and potential development guidelines for each approach. The research aims to engage design researchers in a discussion on sustainable design, its development over the last decades and, more importantly, in the future.

Discussion

Ecology and design in brief

The discourse of sustainable practice was born in the middle of the twentieth century, thanks to the efforts of pioneers such as Buckminster Fuller and Victor Papanek. More systematic engagement began in the early 1980s, when environmental and social issues attracted the active interest of industry. "Design for the Real World: Human Ecology and Social Change" (Papanek, 1985) is harshly criticized by the design profession, who point to the author's role in promoting consumption which contributes to environmental and social degradation. His work is focused not only on improving the results of design work, but also on transforming the profession itself. The transition from the notion of "green" to "eco" and to "sustainable" in the field of design represents a constant extension of the scope of the theory and practice of the ever more critical perspective on ecology and design. Sustainable design expands its intervention range over the years, showing chronological development. In the first half of the 1990s, it focused mainly on products by developing and consolidating green and eco-design. Other productlevel approaches are outlined in the late 1990s, such as Biomimicry, and later from Cradle to Cradle Design, Emotionally Sustainable Design, Design for Sustainable Behavior, Design for the (BoP) Pyramid (consisting of 4 billion People who live on an income of less than US\$3 a day).

In my view, sustainable design approaches appear in 4 different levels of sustainability. The first, is the level of product innovation, where design approaches are aimed at improving existing or developing completely new products. The second level concerns product and service innovation: here, the focus is on developing new business models by integrating combinations of products and services. A third level is constituted by spatial-social innovation, where the context of innovation is human settlements and the spatial and social conditions of their communities; the focus can vary in scale, targeting neighborhoods or entire cities. Finally, the fourth level of innovation in the socio-technical system. At level 4, design approaches focus on encouraging radical change in how social needs such as nutrition and transport/mobility are met, and thus support transitions to new socio-technical systems. Each of these will now be considered in more detail.

Level 1: Green and "eco" design

The first examples of green design practice (Burall, 1991; Mackenzie, 1997) focus on reducing environmental impact by reworking the specific qualities of individual products. Early projects targeting the use of renewable energy also occur during this period. Other approaches to the design environment focus on efficiency in product and process engineering, from recycling to recyclability, and the ease with which products can be disassembled for repair. This practice promotes a green consumer

approach but lacks the capacity to generate environmental gain (Madge, 1997).

Eco-design constitutes a major and significant improvement to green design, as it focuses on the entire lifecycle of products—from raw material extraction to final disposal (Boks & McAloone, 2009; Pigosso, McAloone, & Rozenfeld, 2015; Tischner & Charter, 2001). In eco-design, the environment stands on equal footing to traditional industrial values such as profit, functionality, aesthetics, ergonomics and overall quality (Brezet & van Hemel, 1997; Binswanger, 2001). The main goal of eco-design is to reduce the consumption of natural resources. From a practical point of view, a quite complete set of principles, guidelines and eco-design tools have been developed. Eco-design offers several design strategies to extend the life of the product such as: Emotional Durable Design, Design for Sustainable Behavior, Nature Inspired Design, Cradle to Cradle Design, Design and Biomimicry.

Although the focus of eco-design on life-cycle provides significant advantages over the practice of green design, it also has significant drawbacks. It focuses solely on environmental performance (Gaziulusoy, 2015) and therefore neglects the social dimensions of sustainability that also cover the distribution of resources and the social product that are not taken into account in life-cycle assessments. Eco-design brings enormous environmental benefits once inefficiency and "bad design" have been removed from the products, but they are insignificant and increasingly expensive (Ryan, 2013a, 2013b). In addition, efficiency does not get into account the effects of increased product consumption that outperforms eco-efficiency improvements (Ryan, 2002, 2003) because it does not get the consumer behavior.

Level 2: Product and service systems

Design approaches embedded in the level of product innovation, such as green and eco designed discussed above, are critical to reducing the impact of products and production processes on the environment. Although these are fundamental and necessary, they do not achieve the necessary radical improvements in sustainability. While they lead to improvements in the environmental performance of products, these are offset by increases in consumption.

From this perspective, some researchers have shifted focus to "Product Service System Design" (PSS) as a promising sustainability approach. This approach can be defined as a mix of tangible products and designed intangible services that are combined, and integrated, to meet the needs of the end user (Tukker & Tischner, 2006). Another area in which this design approach focuses is the application of PSS design in the context of low income, namely PSS design for pyramid base (BoP).

Level 3: Spatial-social innovation

The broad and systematic understanding of social innovation as a creative recombination of existing assets (Manzini, 2014) avoids an overly techno-centred focus and recognizes the crucial role of people and communities. "Creative Communities" (Meroni, 2007) is the commonly used term that shows that social innovation is the ingenuity and creativity of people and communities (Jougeou and Manzini, 2008). Manzini (2014) identifies social innovation design as a "a constellation of design initiatives geared toward making social innovation more probable, effective, long-lasting, and apt to spread". Design is another approach inspired by nature, which focuses on biomimetics, imitates the natural ecosystem and combines elements of biomimicry, Cradle to Cradle Design and industrial ecology. To that end: In addition:

" the Systemic Design approach seeks to create not just industrial products, but complex industrial systems. It aims to implement sustainable productive systems in which material and energy flows are designed so that waste from one productive process becomes input to other processes, preventing waste from being released into the environment" (Barbero & Fassio, 2010).

"Systemic Design adopts a territorial approach, looking at local socio-economic actors, assets and resources, with the aim of creating synergistic linkages among productive processes (agricultural and industrial), natural processes and the surrounding territory" (Barbero and Fassio, 2011).

Level 4: Socio-technical systems

'Design for System Innovations and Transitions' focuses on the transformation of social and technical systems through technology, social, organizational and institutional innovation. It uses the design of product service systems (level 1), transforms production and consumption systems through business innovation (level 2) and social innovation design that promotes social change without seeing technological change as a determining factor (level 3).

Research efforts in the field of design are centered on cities (Ryan, 2013a, 2013b; Ryan, Gaziulusoy, McCormick, & Trudgeon, in the press) which are essentially sociotechnical systems. This focus is different from traditional sustainable urban design and planning, in that it focuses on urban form, urban growth, viability, reduced energy use, and the creation of a different sustainable architecture that focuses on individual buildings, and finds its place in the theoretical urban structures as complex adaptive systems. The outlining of cities as complex adaptive systems requires an understanding of the relationship between technology, ecosystems, social and cultural practices, and city management in design decisions (Marshall, 2012). To achieve this, the system innovation design integrates different theoretical areas while using multiple supportive approaches, such as speculative design, futures design, and engagement design.

According to my current understanding, sustainability is a challenge that needs to be addressed at the level of the socio-technical system. The preceding approaches, which are less systematic, however, are no less important. It is true that lower-level approaches (those that focus on product innovation) are not sufficient, but – in my view – every sustainable design approach must be appreciated and used to its strengths and weaknesses and together with complementary, project-based approaches after systematic analysis. This is because tackling the challenges of sustainability requires an integrated set of approaches covering different levels of innovation. Approaches falling within the socio-technical level of innovation demonstrate this requirement.

The actions taken, however, are far from sufficient to address sustainability issues in general. Thus: "(With increasing recognition that, to achieve sustainability, there is an urgent need for radical and transformative restructuring of socio-technical systems that meet our needs. Cover not only product and process innovations but also changes in user practices, markets, policies, regulations, culture, infrastructure, lifestyle and management of firms)".

The resistance is not a destination but a journey—a journey that will require fundamental and radical changes in our socio-technical and socio-ecological systems in the era of Anthropocene.

Anthropocene

As a result of the fundamental technologies, human evolution no longer moves at biological velocity (that is, from generation to generation), but rather with technological speed (much, much, faster). In fact, our planet today is increasingly populated by complex adaptive systems that integrate human and natural components. And as people increasingly integrate with the technology around them, and as the development of this technology continues to accelerate, it is doubtful that what we will have in 50 or 100 years will still be something like an anthrop. The fact that we will become an epoch after ourselves, precisely at the time when we become a designer space, illustrates only the lack of predictions and how badly we have prepared for the terraformed planet we have already built.

The Anthropocene suggests humans as the main culprit of the current situation on Earth, but does not point to the fact that the minority of the Earth's population has caused much of the damage or does not expand the debate to include those most affected by climate change, but whose role in its effectiveness is negligible. Without genuine joint and integrative research, many of the critical exchanges around the concept are likely to continue to break apart fragmented research programs and intensify the dismantling of disciplinary boundaries. Here, it may sound paradoxical, but art initiatives that stimulate critical thinking and do not simulate action have the potential to be most constructive in dialogue.

In her book, "Minor Ethics for Anthropocene," Ioanna Zilsinska called Anthropocene a "Crisis of Critical Thinking," and suggested that "thinking is the most political thing we can do in terms of the anthroposis before we start and do something else." Since critical thinking is a type of doing that facilitates thinking, the work of critical, conceptual and speculative design may be best suited to addressing Anthropocene. Design may be best suited to dealing with anthropocentes. Further, because the Anthropocene as a geological epoch may eventually be rejected by the ICS, we might consider how Anthropocene can be useful as an "ethical pointer" and an imperative for critical thinking.

It is necessary to go beyond the geological aesthetics and the "rhetoric of decline" to do the work of philosophy. To do so, the art and design that seek to pay attention to the Anthropocene need to go beyond geological aesthetics and "The rhetoric of decay" and to do the philosophical work. Zylinska suggests we approach Anthropocene through "a different way of philosophizing, one that produces ideas with things and events rather than just with words". Referring to his writing on ethics. Zilinska proposes to move closer to the Anthropogen through "another way of philosophy that produces ideas with things and events, not just in words." By doing philosophy as such, art that addresses Anthropocene can make use of critical and "non-instrumental modes of thinking" to avoid "easy solutionism and what some theorists have called derangement of scale" that plagues Anthropocene discourse, especially within the techno-corporate sphere. By making philosophy as art that deals with anthropocenter, they can use critical and "non-instrumental ways of thinking". By focusing on propositions rather than solutions, artists and designers can challenge the heroic, solutionist and masculinist narratives of the Anthropocene, instead provoking dark discussions and radical thought experiments. By focusing on suggestions rather than on decisions, artists and designers can challenge the anthropogenic stories instead of provoking dark discussions and experiments with radical thoughts. The ops they offer are utopian and incredible and mature with questions, not with solutions.

This is where the prefixes "critical", "speculative" and "conceptual" come in: unlike mainstream design, which is supposed to assert the status quo and be easily assimilated—critical, conceptual and speculative design raises awareness, exposes assumptions, sparks debate and provokes action against cultural norms. These are "critical", "speculative" and "conceptual" practices and, unlike traditional design that has to validate the status quo and be easily assimilated, critical, conceptual and

speculative designs raise awareness and assumptions by provoking action against cultural norms. It presents the opposite of an easy answer by revealing that the problems we face are incredibly complex.

While many of the art and curatorial projects that address Anthropocene run the risk of making our current geological crisis seem easy to conceive with perhaps as an unintentional side effect of trying to make the concept approachable to mass audiences, speculative design may offer avenue for parsing out of the complexity of the situation. This does not mean that speculative design projects that address Anthropocene will solve the problem - the fact that they do not is what makes them constructive. As we look to the future, we will see not only the planetary change, but we can even see changes in ourselves as a species. We invite you to contemplate: What will it mean to be human in the future of Anthropocene? It is time to ponder: What will it be like to be a man in the future of the anthropo? The debate is open.

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