PRINCIPLES OF A POS-ANTHROPOCENTRIC DESIGN: REFLECTIONS ON A CASE STUDY

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ABSTRACT

This paper reports the preliminary results of an ongoing investigation at the Design & Sustainability Research Center of Paraná Federal University into a more effective contribution of Design regarding climate change. It focuses on the new paradigm of a post-anthropocentric design. Its content is the result of a literature review and a reflection on action design research developed during the preparation for a remote workshop carried out in São Paulo, Brazil. The challenge was developing pos-anthropocentric solutions for Buenos Aires Park, where nine of the ten clients were non-humans. The paper presents a set of five pos-anthropocentric design principles, illustrated with human and non-human requirements and preliminary design propositions.

KEYWORDS

Pos-anthropocentric design, Biocentric design, Design for Sustainability, Earth centric design, Design for nature.

1. INTRODUCTION

Humans are destabilizing the planetary systems that are necessary for its own survival. In order to change the situation, there is an urgent need for a profound transformation on lifestyles, developing new social norms, new aesthetics, new ways of interacting with nature and, very importantly, new ways to cooperatively tackle common challenges. An underlying paradigm shift is the move away from the widely adopted anthropocentric approach on problem solving.

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The term “anthropocentric” is a term used in the field of philosophy of ecology and was first coined in the 1860s whilst the term “ecocentrism” related to conservation was suggested by Leopold & Schwartz (1949). Within an anthropocentric paradigm the non-humans are considered as being of secondary value and, quite often, disconnected from humans. Paradoxically the biotic and abiotic interactions of humans with nature, regardless of being actually perceived by humans, are essential to the long-term survival of humans (BENTHAM, 1780). Nesshöver *et al*. (2017) draws attention to the anthropocentric perspective that permeates proposals for managing environmental resources, manifested by the emphasis on the benefits that nature can offer to human beings.

The relationship between the different forms of life is permeated by the political and social world of the human species, where instrumentalization such as production (biotechnology), maintenance (food production) and reification (human projection onto other species) prevail (VELÁSQUEZ *et al*., 2021). Neumayer (2003) proposes the notion of strong versus weak sustainability: “weak sustainability” allows the substitution of different forms of capital (man-made or technological, human, social, natural); in constrast, “strong sustainability” underlines the primary role of natural capital in sustaining human life, and does not present natural capital as totally substitutable (NEUMAYER, 2003).

Conventional approaches see nature as a never-ending reservoir of resources to fulfill human needs, regardless of the implications of such approach on the protection and wellbeing of other species. According to Vezelovaa & Gaziulusoya (2019) the anthropocentric culture permeates or ways of ignoring, diminishing, or denigrating the needs of other species and natural systems is strongly present in Design. Paradoxically, by disregarding the wellbeing of other forms of life, the conditions for human life on Earth is also increasingly diminished.

To embrace the new required paradigm Design has to adopt a more nature inclusive perspective, embedded with bioinclusive ethics, challenging the paradigm that posits humans as detached or superior to nature (VESELOVAA & GAZIULUSOYA, 2019). It is essentially embedded with the concept of posthumanism where the central anti-thesis argues that a true liberation of non-humans implies the liberation of human themselves. It implies to recognize non-human specific capabilities and essence (SPANNRING, 2015).

On such context this paper reports initial insights of an ongoing investigation, carried out at the Design & Sustainability Research Center of Paraná Federal University, into concepts, principles, heuristics, methods and tools to enable a post-anthropocentric Design. The first project investigated at NDS/UFPR on this topic initiated in 2017 and focused on developing a solution to protect a native stingless bee (*Tetragosnisca angustula*), widely present in the Brazilian urban environment (SANTOS & VAREJÃO NETO, 2021). On this paper it is reported insights gathered on the activities that were developed in preparation for a remote workshop developed in 2021 in the city of São Paulo, focused on a practical application of pos-anthropocentric design.

2. RESEARCH METHOD

The research method has used a literature review carried out in conjunction with design science research. “Design Science” is a research method where the efficiency and effectiveness of an artifact in solving a category of problem. Its constructive and prospective characteristic, seeking to establish “how it should be” contrasts with the analytical characteristic of other methods that seek to understand “how it is” the real world. Unlike the tradition of natural and social sciences, which seek to understand phenomena in the world, Design Science is based on the tradition of Design itself, where the idea of developing artifacts to change the world on a prescriptive way is prevalent.

The target artifact on this study was a scoping study on preparation for a remote workshop on non-anthropocentric design on the city of São Paulo. The challenge was devising a set of solutions for Park Buenos Aires (see left image on the Figure 1), with a focus on using the trunks of trees that were collected within the park premises (see right image on Figure 1).

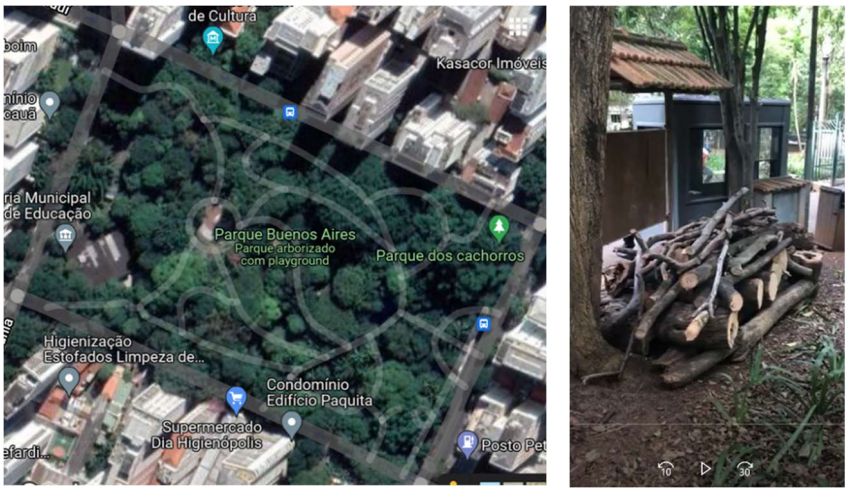


Figure 1: *Park Buenos Aires (São Paulo) and the available wood material for the project*

The selection of species for the workshop has benefited from an inventory of wild species across São Paulo, carried out by its City Council (PMSP, 2018). From that document ten species were selected for the study (see Figure 2) : 1) *Isoptera* (termites); 2) *Euglossa sp* (stingless bee); 3) *Bryophyta sensu scrito* (moss); 4) *Schizosaccaromyces pombe* (*fungae*); 5) *Fountainea ryphea* (borboleta rubia); 6) *Platypodinae* (besouro de ambrosia); 7) *Didelphis aurita* (Gambá de orelha preta); 8) *Vireo olivaceus* (juruviara); 9) *Trichonephila clavipes* (aranha tecedeira) and 10) *Homo sapiens*. Worth remembering that a pos-anthropocentric does not means an exclusion of humans from the Design process.

Figure 2: *Clients[1] for the Buenos Aires Park – São Paulo*

3. RESULTS AND ANALYSIS

3.1. Bioinclusive principle

This principle means to actively include non-humans needs into the design process. The implementation of the Bionclusive Principle can adopt direct approaches, more focused on primary data and involving onsite direct observation using photos, diaries, sketch books, probes, autoethnography and the wide range of digital tools and technologies such as IoT (Internet of Things). indirect approaches, such as reviews of existing knowledge on the literature, consultation to

[1] Human face generated by AI at https://generated.photos/face-generator.

multidisciplinary experts (ex: biologists), interviews with natives to gather wisdom about local species, among others. The limitation of this approach, which was the one adopted on the present study, is the fact that existing knowledge often is intrinsically anthropocentric, demanding a critical analysis to separate the information that can be useful on a more biocentric emphasis.

Next table shows the results of the identification of needs among the project "clients", as well as insights for solutions that could make use of the available wood on Buenos Aires Park.

Client	Sample of Identified Need	Problem	Design propositions
	*Vireo olivaceus* (juruviara) needs small plants and branches to camouflage its nests on the higher part of trees	Current cleaning and maintenance approaches in the park take away the fallen organic material	Creating spots for a "bird stationery" with raw materials that can enable the production of their nest.
	*Trichonephila clavipes* (aranha tecedeira) needs points of support that enables the fixation of its 1 meter web	Although this spider is not venous its nest is often destroyed by humans. There is reduced points of support due to the distances among trees.	Creating protection barriers against humans around spots where wood components with 1 meter among each other would allow the web fixation.

Table 1: *Applying the Bioinclusive Principle using Secondary Information*

As Table 1 shows, applying this Bionclusive Principle entails a practice of interspecies empathy, with respect for "others" with whom one shares and forms part of the ecosystem. It can result on a scenario of exchanges where a relationship of mutual affection is established (VELÁSQUEZ *et al.*, 2021). Veselovaa & Gaziulusoya (2019) suggests the adoption in bioinclusive approaches that explicitly acknowledge non-human role on a participatory design, ensuring that nonhumans can impact the goals of a Design project. Non-humans should be included in decisions that affect their lives through approaches that enable such participation (VESELOVAA & GAZIULUSOYA, 2019). Hence, the design process should guarantee wide governance, involving all relevant stakeholders and all forms of pertinent multi/inter disciplinar knowledge and information (MOSLER & HOBSON, 2021). Indeed, adopting this principle requires from Designers a widening of its already inter/multidisciplinary characteristics. One of this new partner disciplines is zooanthropology, a multidisciplinary field that studies the (development of) relationship between human and nonhuman animals (SPANNRING, 2019).

3.2. Biorhizomatic principle

This principle means that the Design process should consider that all living beings are mutually interdependent, with interconnections not always evident or visible. It requires an open learning attitude to continuously understand the myriad of interconnections on the natural world, bringing this understanding into the design process. Many of these interconnections are not seen or perceived by humans (see left image on Figure 02) or, if seen, not perceived as relevant. Hence, the goal of this principle is to achieve a holistic understanding of these myriad of interconnections, including those that are spread in space and time (see right image on Figure 02). Some of these connections lave long time and geographical spams, with intergenerational implications within the same species and, also, with a variety of implications of inter-species interactions.

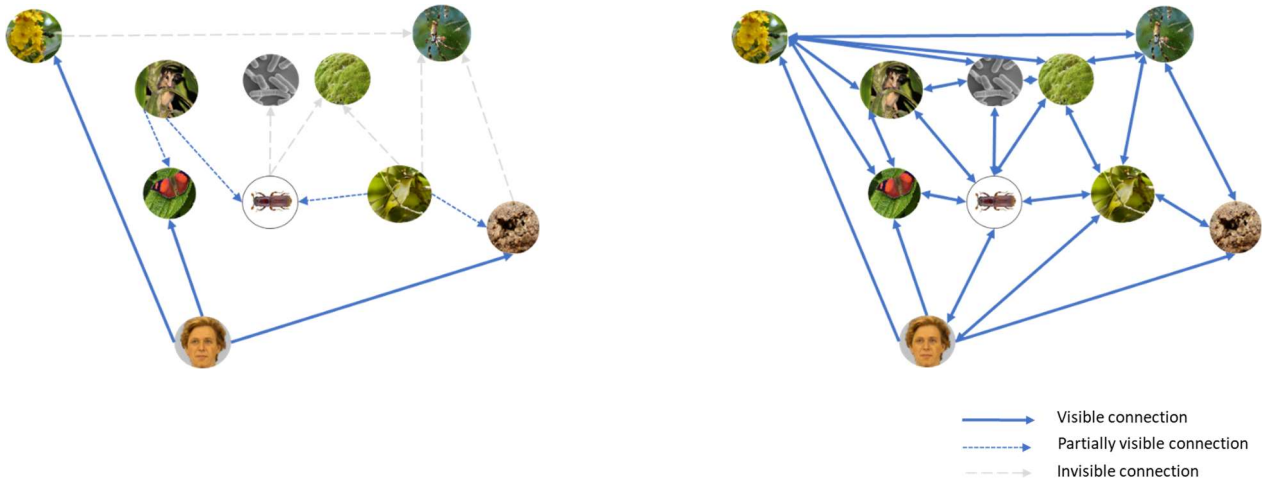


Figure 3: *A limited view of nature interdependencies (left) x comprensive undestanding of interdependencies (right)*

The invisible interdependencies and connections between Isoptera (termites) and *Euglossa sp* (stingless native bee) exemplify the practical implications of the biorhizomatic principle. Isoptera enhances the diversity of soil microbes; cycling of nutrients in the forests, returning minerals to the soil; important on the food chain, being the prey of echidnas, predatory ants, spiders, lizards and birds. At the same time *Euglossa sp* pollinate native plants, many of which can't be pollinated by introduced bees and it is also a prey of predatory ants, spiders, lizards and plants. Notice that both *Trichonephila clavipes* (spider) and *Vireo olivaceus* (bird), two of the project "clients", rely their survival on the existence of insects such as those. Table 2 presents some of the initial design propositions that were elaborate prior to the development of the workshop, based on the understanding of the relevance of these interdependencies.

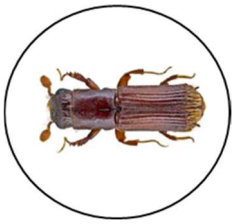
Client	Invisible interdependencies	Design propositions
	Isoptera (termites) gut is host to a complex microbial community (prokaryotes, flagellates). They masticate the wood, breaking it down, and the microbes chemically digest the wood into smaller molecules that the termites are able to absorb and utilize.	Signaling protocol and devises for those trees that are being attacked by termites to avoid the use of insecticides or the early removal of their food source
	*Euglossa sp* (stingless bee) specializes on visiting flowers from *Spathiphyllum cannifolium, Duranta erecta, Gustavia augusta, Ouratea cuspidata, Stachytarpheta cayennensis, Clusia fluminensis, Inga laurina, Tabebuia rose-alba e Cuphea gracilis.*	Creating pollination corridors across the park with native plants required by *Euglossa sp*

Table 2: *Applying the Biorhizomatic Principle*

This exercise exemplifies the need for Designers to recognize and work within the natural spatial and temporal scale of ecosystems, developing a deeper understanding of the often-invisible dynamics of species life cycles as well as their complex interrelationships. Mosler & Hobson (2021) proposes that such understanding might include the adoption of a meta-systemic perspective by taking into account the relationships with adjacent sites and ecosystems on the neighborhood and wider landscape.

3.3. Biosynergetic principle

The Biosynergetic principle means to actively seek environmental rebalancing via the recognition and reestablishment of synergies between living beings and, between these living beings and the natural environment. It is is important to understand that these synergies have a wide spectrum of possibilities: mutualism (interaction between two or more species, with a mutual benefit), commensalism (benefit happens to one organism whilst the other organism is neither benefited nor harmed); parasitism (when a parasite lives on/in another organism (host), causing some harm); neutralism (when two species interact but do not affect each other or have negligible impact); amensalism (when one organism inflicts harm to another without any benefit; competition (interaction where the fitness of one is lowered by the presence of another) (PUCCINELLI & MCQUAID, 2021).



Platypodinae
(besouro de ambrosia)

Platypodinae beetles live in symbiosis with different microorganisms (filamentous fungi, yeasts, bacteria and protozoa) that inhabit their digestive system. Male or female beetles, depending on the species, build galleries in trees, where females oviposited and inoculate fungi symbionts that will serve as food, mainly for larvae. By maintaining a fungus-based diet, the insect supplies the lack of salts, steroids and group B vitamins. Mutualistic fungi inoculated by these insects are carried in special reservoirs, called mycangia, located in different regions of the body or internally, depending on the beetle species (Reis, 2017).

Schizosaccaromyces pombe

Figure 4: *A limited view of nature interdependencies (left) x comprensive undestanding of interdependencies (right)*

This principle deals with the conservation of ecosystem structure, functions and natural networks and connectivity. When adopting a non-anthropocentric approach Nature Based Solutions can contribute towards this goal. For instance, it can secure and multiply diverse habitats for key species, creating steppingstones and corridors for better physical and functional connectivity within ecosystems. With the restoration of physical features of degraded habitats, e.g. strengthening morphological structure of rivers by stabilization of slopes with vegetation or biotextiles reintroducing regulatory species, stimulating soil development with fungi and microorganisms, re-establishing mutual relationships among species (KRAUZE & WAGNER, 2019).

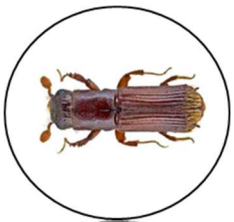
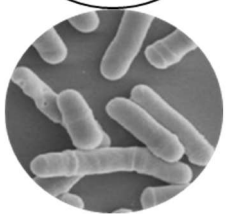
Non Human Client	Habitat requirement	Current problem	Design proposition
 	*Platypodinae* (besouro de ambrosia) needs trunks with 40% umidity to initiate a new colony. As consequence, its mutualist partner is also unable to strive (*Schizosaccaromyces pombe* (*fungae*).	Fallen trunks are storaged in piles, drying out more quickly and regularly being taking away from the park by the maintenance personnel.	Allow that some of the trunks remain on the floor, on shaded areas and where it is more likely to become humid. A small water fountain/ reservoir for birds could be installed close to it, using the washing out activities of birds to spread the water on the trunks.

Table 3: *Applying the Biosynergetic Principle*

Caring for the relationship between species is a matter of design. In order to articulate this contribution Velásquez *et al*. (2021) proposes the adoption of the notion of "interaction zones" on this process: meeting points between the species of a certain ecosystem. A pos-anthropocentric design is strongly dependent and influenced by what other

species do (interdependence) in common spaces (interaction zones) with the intention of creating spaces for dialogue for exploration in design activities that facilitate interactions between species (VELÁSQUEZ *et al*., 2021).

3.4. Bioequity principle

The Bioequity Principle consider in equal manner the relevance of all forms of life, whether human or non-human. Following Mosler & Hobson (2021) argument, it considers and value the diversity of natural environment and of native species. All natural things have their own intrinsic and inherent worth. They are and exist on their own sake, without consideration of any real or imaginary perception of value on human civilization (MANSON, 2000).

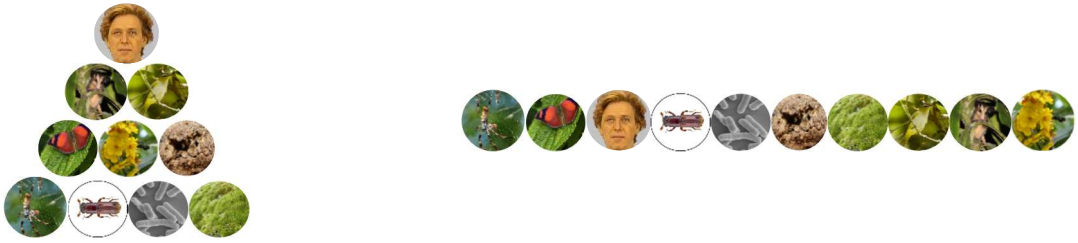


Figure 5: *An anthropocentric hierarchy of priorities among species (left) x an equitable perspective (right)*

This principle is in line with deep ecologist thinking, which argue that the biosphere does not derive in any way from what it provides to humans or how it is regarded by humans (MANSON, 2000). This is perhaps the most challenging principle as it questions fundamental beliefs about human prominence on this world. The different perspectives found within nature conservation exemplifies this clash of different paradigm: there is one perspective that considers the intrinsic value of nature and another one with a more narrowed one, focused only on human interests. The first perspective is seen among biocentric conservationism, focusing on protecting species and ecosystems due to their intrinsic value. The second is seen among the anthropocentric conservationists with a focus on conservating nature in order to extract ecosystem services to guarantee human health and wellbeing. These are in fact extreme positions of a continuum of possibilities with the difference that one is specie-specific and the other is multi-species (CHEE, 2004; MORELLI *et al*., 2016).

3.5. Mutual Becomings Principle

The Mutual Becomings Principles means that our interaction with nature leads to a fundamental reciprocity, with changes in nature changing ourselves and vice versa. Reciprocity, in turn, requires interaction, exchange and proximity. Under such principle non-human's behavior can be affected by their interactions with humans and vice-versa. According to Birke *et al*. (2004) within mutual becomings, humans and non-humans engage in mutual decision making, resulting on a co-created choreographic behavior.

In the case of the human/non-human clients at Park Buenos Aires the implications of this principle can be exemplified by the proposition of installing an artefact to enable access to fresh water for the animals. Hypothetically that would trigger a chain of events that would affect the behavior patterns of all those interacting on that environment (see illustration on Figure 6). A small fountain of water would attract more humans, slowing down the pace of their urban lifestyle, contributing to have more contact with the green space. Indeed, access to green areas contributes to preventing socioeconomic inequalities arising from inequity in the health of the population as there is a correlation between the existence of a green area in urban areas and a reduction in morbidity and mortality (FAIVRE *et al*., 2017).

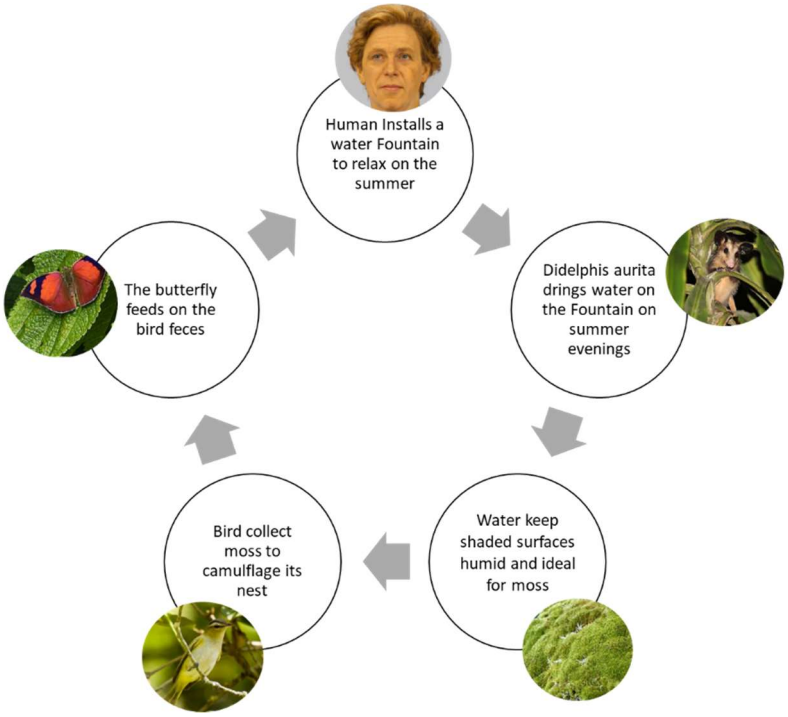


Figure 6: *Exemplifying reciprociy on a chain of events*

Didelphis aurita (Gambá de orelha preta) circulate on the park on the night and, therefore, it would probably access the water when humans were not around. *Vireo olivaceus* (juruviara) would not only drink water on the fountain but quite likel have its summer bath on it. Their activity would splash water around the fountain. If positioned around the fountain, the tree trunks would then have a more ideal environment for *Bryophyta sensu scrito* (moss) which is material that later *Vireo olivaceus* (juruviara) would use to camulflage its nest, which is positioned on the higher part of the trees. The feces of birds around the fountain could provide the minerals that are required by *Fountainea ryphea* (borboleta rubia) diet. The presence of butterflies would reinforce the attraction of the place for humans. *Platypodinae* (besouro de ambrosia) and its mutualist partner *Schizosaccaromyces pombe* (*fungae*) would have a better chance of finding wood with the necessary 40% of humidity. As the water would attract *Euglossa sp* (stingless bee) and other insects, the surrounding area would be a more likely place to *Trichonephila clavipes* (aranha tecedeira - spider) to install its nest.

As this example of abductive reasoning exemplifies, the underlying belief of the Mutual Becomings Principle is that humans and non-humans together can engage on a dialectic relationship where both affect each other. Indeed, on a variety of degrees other species do affect the environment which in turn affect human life and living conditions. This act of relating to each other is affected by the characteristics of the everyday encounters and it is on these encounters that the human x non-human relationship is formed (OMA, 2006).

4. CONCLUSION

Conventionally sustainable development is understood as the one that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987: 43). “Future generations” clearly restricted humans, with the preservation of nature seen as a way to enable well-being for future generations. The post-anthropocentric paradigm changes the underlying ethics of this definition by considering that “future generations” entails humans and non-humans.

Some of the principles presented on this paper are counterintuitive to orthodox wisdom in the Design field, where a human-centered Design is widely taught and understood as synonymous of good Design. Hence, applying these guidelines demands revision of our ethics, logic and aesthetics. That will require the development of a new foundational

theory to support actions and, also, a new array of methods, aesthetic, ontology and epistemology in the Design field. This is a knowledge frontier that requires urgent attention of researchers on the Design field, as it provides more effective answers to the challenges that climate change brought to this planet.

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