DESIGNING SUSTAINABILITY FOR ALL OR CO-DESIGNING SUSTAINABILITY WITH ALL?

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ABSTRACT

The paper discusses the critical difference of modernist approach of designing for- and increasing approaches of designing with- or across-, in this case with/across the overall eco-system. The research aims to engage all possible agencies in urban environment for its shift from Anthropocene. Such attempts resulted in ratification of its own design field called Systemic Approach to Architectural Performance. The research by design is generated through real life community trans-disciplinary observations, gigamapping, full-scale prototyping and their performance reflections and re-designs, being called the 'real life co-design laboratory'. It is achieved through two layers: engaging the communities at place with prototypes as well as placing parametric recipes for DIY online. The prototypes are therefore also exhibits with QR codes leading to the DIY recipes to be locally adapted for specific parameters. This work is therefore oscillating between the 'bottom up' and the 'top down' approach, targeting the local specific communities worldwide.
Key Words: systemic approach to architectural performance; post-anthropocene; co-design; diy

1. INTRODUCTION

With Joachim's positivist designers foreseeing of sustainable futures perspective (Joachim, 2015), the newly ratified design field of *'Systemic Approach to Architectural Performance'* (SAAP) (Davidová, 2017) is focusing on a shift towards Post-Anthropocene in build environment through real time and real life actions. Dealing with complexity of real world happening in real time, it is *'resisting reduction'* (Ito, 2017) through so called *'real life co-design laboratory'* (Davidová, Pánek, & Pánková, 2018). There has been discussed similar notion of so called *'real-world laboratory'* or *'real-world experiments'* and similar concepts that are also engaging co-design through full scale prototyping are already meeting commercial architectural practice, such as Helen & Hard studio from Norway, Stavanger (Stangeland, 2018). However, such co-design processes are distinguished from the *'result'* and are final end product solution and result oriented (Bernert, Haaser, Kühl, & Schaal, 2016). This gives the end to the co- and re-design processes at the moment when the concluded proposal starts meeting the *'real life'*. There is therefore a critical difference between co-designing for- and co-designing with- and between real world and real life design. The second notions, respectively, are achieved in and through real time interaction and the end product is the generative real time and real life process itself. The discussed work is grounded in *'Performance Oriented Architecture'* and its *'non-anthropocentric architecture'* (Hensel, 2013), approached through *'Systems Oriented Design'* (Sevaldson, 2013). It is integrating into it such processes like *'anticipation, sensing, curation, collaboration, production, interaction, mobilisation, measures, adaptation and incubation'* for achieving *'ecological urbanism' (Mostafavi & Doherty, 2016b, 2016a)* within cultural landscape. Said in other words, the real life cultural environment adaptation towards Post-Anthropocene.

Performance in architecture was reformulated by Hensel as a driving concept for design that helps re-consolidate form and function into a synergetic relation with the dynamics of natural, cultural and social environments, and in so doing, locate performative capacity - *'active agency'* – in the spatial and material organisation of architecture, in the human subject and the environment through the dynamic interaction between these four domains (Hensel, 2010). However, this very progressive work, though focused on full scale prototyping and the prototypes performance, has been also struggling with the issues discussed in the above paragraph. It is ending in the moment when the so emphasised *'active agency'* starts taking place in real life.

Systems Oriented Design employs such *'active agency'* within its *'rich design research space'*. The Rich Design Research Space concept takes into account the physical, social, and cultural spaces, and the virtual and visual media spaces in which the research-by-design takes place. It is an integral approach to design that embraces many types of investigation, from analytical to intuitive and is to be reflected upon (Sevaldson, 2008). This work is fully integrating and transferring the above concept into the real life, in real time.

The fusion of the two above fields that is engaging *'Time-Based Design'* (Sevaldson, 2004, 2005) resulted in its own hands on real life co-design field, Systemic Approach to Architectural Performance. The meeting of the real time and real life world is achieved through generative agenda of *'prototypical interventions'* (Doherty, 2005) that aim for large output out of rather small but targeted generative input across the eco-system[1] within local specific environment[2] (Davidová & Prokop, 2018; Davidová & Zímová, 2017, 2018). Such field considers all co-living and co-performative generative processes as the co- and re-designed time based generative 'results' that go even far beyond the life span of the initial interventions and is taking an active role in co-performing biosphere[3].

2. CASES OF CO-DESIGN

This research by design is generating theory through, mainly not for profit, experimental practice. Therefore, many of the processes are not theoretically structured when occurring in real time. They are speculated and afterwards reflected upon and structured. This paper is one of such attempts that is to structure and define several cross-referenced generative co- and re-design types occurring within SAAP. This involves: 2.1. Speculative Co- and Re-Design; 2.2. Interventionist Co- and Re-Design; 2.3. Broadening Co- and Re-Design; 2.4. Feedback Loop Co- and Re-Design; 2.5. DIY Co- and Re-Design.

2.1. Speculative Co- and Re-Design

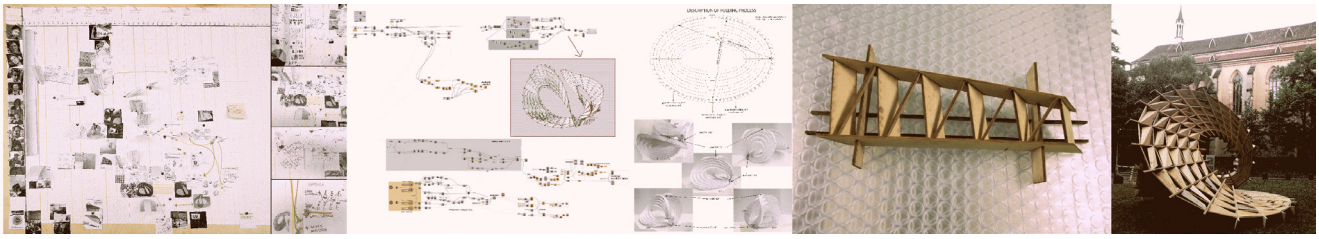
When dealing with sustainable design processes, their design tools are usually reduced to massive technological simulations and this have critical effect on the design itself (Thuvander, Femenias, Ollár, & Unterrainer, 2018). Speculative co- and re-design tries to avoid this through creative collaborative trans-disciplinary mapping of relations and investigating of what could be done. It usually takes form of gigamapping, visualising complex design of what it ought to be complexity (Sevaldson, 2018) and analogue and digital model making and prototyping (see Figure 1).

[1] Ecosystem was described by Allen and Roberts as an ecological system inside the system that includes the geophysical part. (Allen & Roberts, 1993)

[2] 'Environment is physical and biological surroundings of an organism. The environment covers non living (abiotic) factors such as temperature, soil, atmosphere and radiation, and also living(biotic) organisms such as plants, microorganisms and animals.' (Oxford University Press, 2004)

[3] Biosphere is 'irregularly shaped envelope of the earth's air, water, and land encompassing the heights and depths at which living things exist. The biosphere is a closed and selfİregulating system (see ecology), sustained by grandİscale cycles of energy and of materials—in particular, carbon, oxygen, nitrogen, certain minerals, and water. The fundamental recycling processes are photosynthesis, respiration, and the fixing of nitrogen by certain bacteria. Disruption of basic ecological activities in the biosphere can result from pollution.' (Lagasse & Columbia University, 2016)

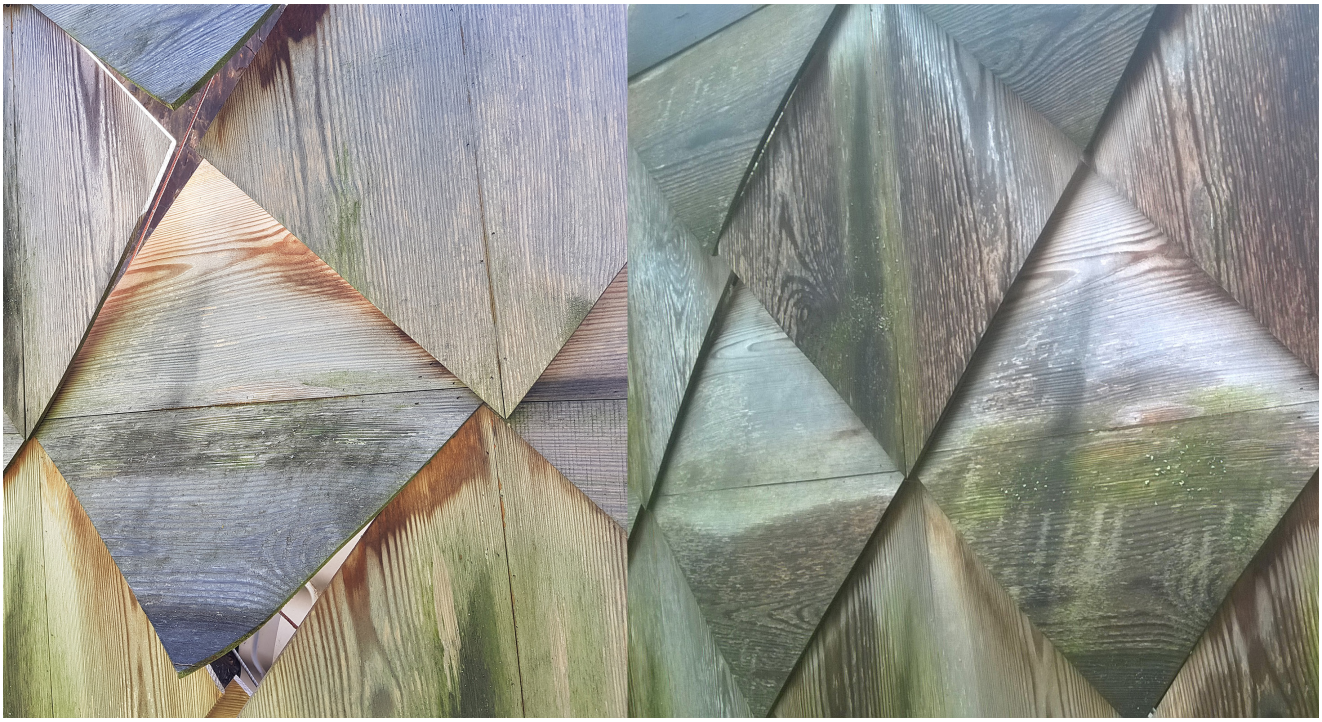
Different agents within these processes can usually keep on their tools' preferences and/or their combinations. This would be where typically the design process ends with the result that would be potentially realised and then left alone by its designers as discussed in the introduction. This is certainly not the case in Systemic Approach in Architectural Performance.



[Figure 1] Design Processes of bio-climatic responsive wood Loop Pavilion that was collective work of a studio at the Faculty of Art and Architecture at thTechnical University of Liberec (FUA TUL) and the Faculty of Forestry and Wood Sciences at the Czech Technical University of Life Sciences in Prague (FLD CZU, led by Collaborative Collective and ARCHWERK. See from left to right the gigamapping process, digital modelling, analogue conceptual model sketching and working prototype for building technique of one rib from the pavilion's structure and the full scale prototype (photos and images: Pokorný, Prokop, Novotná, Hula, Kopecký and Okamura 2014)

2.2. Interventionist Co- and Re-Design

Interventionist co- and re-design takes on the generative and performative agenda of the full-scale prototype in real life environment across its eco-system. The prototypes give rise to cross-species opportunistic use of eco-systemic services, such as climate comfort (hygroscopicity of wood and air flow due to warping), clearing of air polution (the algae and the wood's clearing capacities in case of air flow), urban furniture (the pavilions serve for people and animals), habitation (algae, plants and insects), nutrients (sugar in wood and blossoming plants on or around some of the prototypes, insects as a food source for birds and bats), etc. The performance of such services is however co-designed through integration of interaction across both, living and non-living, biotic and abiotic, agents (see Figure 2Figure 4).



[Figure 2] Responsive solid wood screen Ray 2 co-performing with relative humidity, algae moisture sorption and temperature. The responsive wood panelling is moderating micro-climate: either producing humid air flow through its warping and moisture evaporation in hot and dry weather or sorping and enclosing it in humid and cold situation. This is moderated by algae moisture sorption: larger warping when dry and hot, prevention of warping in opposite direction when it rains. (photos: Davidová 2018 and 2017)

2.3. Broadening Co- and Re-Design

The prototypes' performance can be further on co- and re-designed by their performative and opportunistic users (see Figure 3). This can be supported by public festivals, where multi-genre and multi-disciplinary performers/agents are invited to improvise their prototype's and/or project's performance and use interpretation. Such opportunistic performances and uses have well developed in traditional architecture, specifically in extreme climates. This is because such opportunities were investigated and tested in harsh eco-systemic context over generations (Davidová & Raková, 2018). This includes but is not limited to climatic, socio-cultural, political, wealth and natural parameters of the eco-system. Extensive use and performance observations intensified by public events help to support rapid learning process since as much of the knowledge has been forgotten as well as in current times, we are experiencing rapid fast changes within all above listed parameters.

[Figure 3] From left to right different performers and users interpreting the performance of prototypes pareSITE, LOOP and TreeHugger at festivals reSITE 2013 and EnviroCity 2014 and 2017 (photos: Pedersen, Vajdová, Novotná, Škuta and Carrithers 2013, 2014 and 2017)

2.4. Feedback Loop Co- and Re-Design

The built full-scale prototypes are of means of the true notion of what is the prototyping meaning. This refers to not only the performative capacity but to testing the prototypes' performance and experiencing failures in real time and real life to update further research by design development. The real life interaction, that is usually referred to as 'weathering' (Mostafavi & Leatherbarrow, 1993), is investigating the prototypes' experiments, performances, generative development, transformations and/or disintegrations over time and within real environmental conditions (see Figure 4). There is a 'reflective practitioner' (Schön, 1983) feedback loop amongst successes and failures when meeting real life environment that leads to both bettering our intuition as well as collecting soft and hard data to inform future designs or to update the existing ones. This specifically becomes critical when it comes to performance of the material that is of biological basis. Such performance of the material like wood largely develops over time (Davidová, 2017; Dinwoodie, 2000; Skaar, 2011).

Figure 4: Different life stages after extensive weathering of wood responsive prototypes from left to right: a responsive screens Ray 2 after five years and a Ray 3 after three years, both inhabited by algae, lichen and blue stain fungus (the Ray 3 screen has washed out sugar by salt for preventing an interaction with decaying species); responsive pavilion pareSITE after one and half year of struggling with the interaction of torqued forces within the geometrical structure of Möbius strip with weather extremes of two summers and one winter; a collapse of the LOOP responsive wooden pavilion after the gardener ignored the requirement of turning of the sprinklers that watered the sunny oriented half of it in arid season (the pavilion was afterwards rebuilt at different location) ; and a responsive insect hotel TreeHugger CZ after one and half year fully co-performing with surrounding eco-system, being inhabited by both insects and algae. The prototypes were built within the framework of Collaborative Collective, Defio, s.r.o., Oximoron, Re.Code.Nature, ARCHWERK, Architectural Institute Prague, FA TUL, FLD CZU and CooLAND (photos: Davidová and Novotná 2014-2018)

2.5. DIY Co- and Re-Design

When receiving temporary commissions with unsafe development futures, their opportunities of reaching generative agendas had to be rethought. Therefore, the 'do it yourself' (DIY) generative concept was investigated and developed. The concept of tagging public space with QR codes did not appear purely by itself. It was learned from VR and AR games taking place at the festival EnviroCity (Davidová & Kernová, 2016) events where such interaction was necessary to reach the individuals' media. Realising we can connect the physical landscape with the digital, it clearly opened a discussion of possible co-creation opportunities, going beyond the scope of the festival itself. At that moment, we started placing out our DIY manuals and downloadable parametric codes on our blog (Davidová, 2016). The blog links in the form of QR codes were since then engraved or attached to our prototypes or just simply marked at different fairs events (see Figure 5) or published at professional web sites such as Rhino News (Davidová, 2018). Such way, the research by design is offering generative prototypes globally under the Non-Commercial Use and Modification Creative Commons Licence (Creative Commons, 2017) with the opportunity of local specific adaptation of the initial concept of the 'schools of thoughts' (Hensel, 2015).

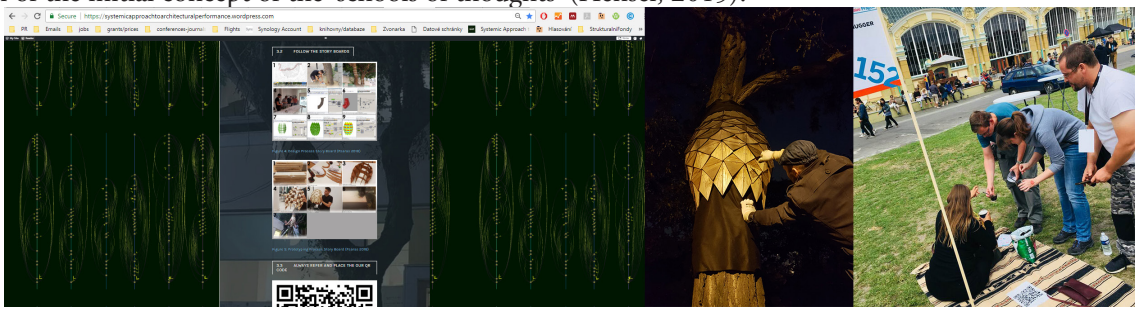


Figure 5: From left to right: A blog for DIY for TreeHugger CY with downloadable code, explaining the adjustments of local specific parameters; Our colleague from Collaborative Collective Ondej Michálek, updating TreeHugger CZ with engraved QR code after public request noticed within the community and on social media, like Facebook; Maker Faire Prague 2018 Cross-Species Eco-Systemic Refreshments Station offering DIY seed bombs of honey producing species and QR code leading to the DIY recipe of 'fast food restaurant for birds and bats', the TreeHugger insect hotel. (images and photos: Davidová and Horák Goryczka 2018)

3. SUMMARY AND CONCLUSIONS

The above experimentation aims in and investigates co-designing sustainability with All - not for All – as an active agency that is co-performing in real life. This is targeted to be tested and achieved within 'real life co-design laboratory' because this is where we attempt to reach such co-performance and there is not always a reason and nor the time to only speculate, neither there is better and more relevant 'laboratory' that could test and approve the speculations. Such co-performances occurring within the 'real life co-design laboratory' are therefore to be co-created in real time across overall real life environment with both living and non-living, biotic and abiotic, agents. This is because humans are part of- and operate within- the overall ecosystem and they cannot shift from the Anthropocene alone just through the logics of the therm. Equally, it is not possible to reach such shift without the humans. This is because we cannot reach environmental justice without social justice and vice versa (Davidová & Zímová, 2018; Haase, 2017; McIntyre-Mills, 2014). The sustainability needs to be achieved by flourishing through and across All (Ehrenfeld & Hoffman, 2013). The exemplified prototypes' real life co-performance co-creation to my believe illustrate well the situation of prototypical generative interventions. Life is not occurring in separate parameters and in static time. Holistically speaking, without 'doing' the shift towards Post-Anthropocene ourselves - means DIY - and together whilst involving All - means collaborative co-creation across the eco-system and biosphere – and mediating the 'bottom up' and the 'top down' approaches, we can never achieve sustainable environment adaptation of the cultural landscape we are living in and wish to survive or even flourish in.

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