

Infrastructure for recombination: The work and ethos of Plethora Project

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ABSTRACT

This paper presents a critique to the traditional business model followed by many architecture studios who utilize the ‘architectural competition’ as a format for developing new ideas and innovation. The abundant competition calls, implying free labour, that architectural competitions facilitate has become a mechanism to coerce architectural innovation towards the benefit of a ruling elite. The Plethora Project studio has attempted since 2011 to hybridize the practice of architecture with forms of entertainment in order to allow cultural engagement and ultimately communicate the challenges that architecture faces not only from a perspective of technological progress but from one of social progress as well. To do so, the medium of video games has been selected to communicate complex systems of interdependence, inviting a new audience of non-architects to participate in the construction of knowledge and discourse by understanding complex webs of interdependence that link material resources, knowledge, labour and access. The studio sits at the intersection

between an architectural firm and a gaming studio with social interest. This implies the necessity for innovation in economic strategies that enable the autonomy of ideas and the development of non-conventional projects.

INTRODUCTION

The work of the architect has a long tradition of dependence over capital and involves seeking clients in the private and public sector that would provide commissions for developing new projects. In this power dependence, the mechanisms for allocation of new work become a funnel for controlling who is able to exercise architecture. Out of this power relation, architecture has developed a long tradition of a transparent and democratic mechanism to determine the most suitable project for a given commission: the architectural competition. In an architectural competition, hundreds of architecture firms compete to receive a commission to build new work. One of those firms, will (although not always) receive a commission for developing and executing a building, while the other 99 percent of the firms will go home empty-handed. While this could be seen through the scope of democratic or meritocratic allocation of resources, it has become evident that it is a massive waste of resources as well as an unethical practice that relies on free labour sustained on the promise of a potential commission. This dynamic generates a fundamental asymmetry between those making a call, the clients or curators, and those executing (often for free) the ideas suggested by a brief. Competition organizers are able to place themselves above the market,

and offer a ‘winner takes all’ model, fundamentally aligned with a current trend of neoliberal economics and practices of extractivism.

Architecture competitions are a tradition that might be very difficult to eradicate as there is a global momentum of using them for large public projects, and almost all success stories of architecture firms rely on a narrative where at some point an office lands a large commission by winning a competition. Therefore, it has become necessary to ‘re-design the profession’ and explore the mechanisms by which an architect is able to develop new architectural ideas. Is under this premise that the studio Plethora Project has attempted to innovate and hybridize the practice of architecture through two tactical moves: a theoretical framework described as ‘discrete architecture’; and the expansion of the architectural medium through the use of software and particularly video games.

DISCRETE ARCHITECTURE

The paradigm of discrete architecture emerges out of a critique to parametrics and its attempt to describe an epochal style, as argued by Patrik Schumacher (2011). While parametrics relies on methods of non-standard production utilizing highly differentiated geometries obtained by bespoke forms of fabrication, discrete architecture proposes to reconsider serial repetition of identical units in order to allow for a more affordable means of construction. The innovation of this method is not to end up with similar objects or architectural propositions, but rather allow the

identical parts to be re-combined in a multiplicity of patterns. In this sense, discrete architecture operates less as the 'jigsaw puzzle' used in parametrics, in which parts fulfil a unique role, but rather more like a 'kit of parts', where parts are designed generically to allow thousands of different part-to-part interactions. Discrete architecture also rejects permanent connections obtained from process like glue or continuous materials such as concrete as they do not offer the possibility for reversibility and reconfiguration.

The development of the ideas of discrete architecture has been greatly influenced by the work of Neil Gershenfeld at MIT, and his description of 'digital materials' (US9506485B2, 2016). As Gershenfeld and Ward explain:

"Digital parts are error correcting and self-aligning, which allows them to be assembled into structures with higher accuracy than the placement accuracy of the assembling person or machine. For example, a Lego™ set consists of discrete parts that have a finite number of joints. The male/female pin joints on the top and bottom of the Lego™ block are discrete connections, which either make or do not make a connection to another block. By contrast, a masonry construction is a continuous (analog) material; while the masonry brick is a discrete unit, the mortar in its fluid state allows one brick to be placed on top of another in an infinite number of positions. Because the joint is not discrete, masonry construction is analog while Lego™ construction is digital." (US9506485B2, 2016, para. 6)

The approach to discrete tectonics is also fundamentally supported by the notion of 'unit operations' developed by Ian Bogost (2006), in which meaning emerges from the coupling of units without belonging

to a larger holistic system. He describes units in their autonomy to a larger structure rather than parts of a whole. His distinction between wholes and multitudes allows for the existence of units without any overarching structure. As he explains:

"A world of unit operations hardly means the end of systems. Systems seem to play an even more crucial role now more than ever, but they are a new kind of system: the spontaneous and complex result of multitudes rather than singular and absolute holisms" (Bogost, 2006, p. 4)

DESIGN AS PLAY

The framework described above became instrumental to conceive of the first large discrete architecture installation, the Bloom project, developed by José Sánchez and Alisa Andrasek for the London 2012 Olympic Games (Sánchez & Andrasek, 2017). In Bloom, one unit was mass-fabricated for a later combinatorial assembly in the hands of a social system. The project utilized injection molding to serially produce, at an affordable cost, thousands of parts that had been engineered to develop a large range of design patterns. While the design team was able to anticipate some of the design permutations that would have a strong architectural impact in the development of a pavillion, the crowd, in the act of playing with the piece, was able to generate a myriad of novel patterns and evolve the strategies for installing the piece in the many locations where it was presented.

The granular aggregations that emerge from the project constitute an 'open-whole,' an architectural fabric that is open-ended to social interaction and in a constant state of dynamism. The project forces a crowd to engage with issues of structure and patterning to achieve any self-supporting configuration. The project was later exhibited at the 'Naturalizing

Architecture' exhibition at Frac Centre in Orleans, France, participating alongside works made by a generation of designers that are attempting to advance the definition of tectonics in architecture (Brayer & Migayrou, 2013). In a different context, Bloom was taken to schools as a toy to enable children to learn structure and logic by configuring prototypical architecture with its large playful units. Bloom became the cornerstone of a research trajectory where the use of games, together with discrete tectonics, would allow combinatorial strategies to be defined for affordable complexity.

Central to the discrete paradigm is an association with social production. However, doing so physically presents a great constraint in time and resources. The possible physical permutations that can be explored by a crowd in a physical system are very limited. The introduction of video game software offers an opportunity to allow thousands of individuals to 'play' (in this context, play is equated to design) and discover a range of possible design alternatives. This was the premise for the Polyomino series, a research project developed at the University of Southern California where discrete units could be manipulated digitally for physical fabrication later. The project proposed two modes of materialization, one in which the completed configurations would be 3D printed, and another in which the units would be manufactured discreetly using magnetic connections to allow larger configurations as described in a virtual environment.

Architecturally speaking, the thousands of permutations that players can generate manipulating discrete units within a video game environment allows for a social emergence of design value, contributing to the vocabulary of correlations that are necessary to perceive order. The game

environment becomes a simulation of inhabitation and perception, anticipating a dialogue addressing design issues, concerns, and intentions.

The aggregations obtained from a gaming software can be materialized avoiding any specialized knowledge. The crowd is in hands of defining the meaning and value of design patterns.

GAMESCAPES

The Polyomino project belongs to a larger research agenda named 'Gamescapes', where video game software is explored in its capacity for communicating a narrative and real-time data for a designer, generating a feedback loop for decision making. On the contrary to principles of artificial intelligence, games are used for intelligence augmentation, following some of the principles of human-machine symbiosis established by J.C.R. Licklider (1960).

Games became a medium of architectural exploration for the studio and an autonomous revenue stream as projects would be evaluated both with research objectives and financial sustainability. The game industry is highly populated by entertainment content but is also open to engage with projects with ulterior agendas. This model provided the foundation to conceive and develop Block'hood, a city building video game based on ideas of ecology, entropy and coexistence. In Block'hood, the city is understood discretely, as a series of simulation blocks that can be combined in a myriad of arrangements. Following some of the ideas of Christopher Alexander's *Pattern Language*, a positive or meaningful city configuration would be described by the patterns between the units that constitute it (Alexander et al., 1977). Contrary to Alexander, Block'hood does not suggest that any pattern is

fundamentally positive or negative; the game only provides the data for the player to make an opinion and take decisions, casting patterns as an idiosyncratic and ephemeral proposition that only acquires meaning through the contingent coupling with a social system.

Block'hood has been developed as a series of discrete databases that interact with one another, each one of them remaining open for new additions over time. These databases are 'Blocks', 'Resources', 'Agents' and 'Events'. 'Blocks' define the building units of the simulation. This could range from building parts to organic pieces of landscape. Each block contains, very much like in BIM software, all the data to perform simulated interactions or transactions with other blocks. To do so, a block uses different channels of communication described by inputs or outputs. The inputs of a block are the resources that a block will require to produce an output. 'Resources', in this sense, describe tangible elements such as electricity or water but also describe intangible units such as community or risk. These two ingredients, blocks and resources, define the first layer of the simulation, the ecological interdependence of blocks. By producing a circularity between inputs and outputs, the game requests a player to find states of balance or surplus.

The research of games for architectural simulation is not extensive but among some of the most serious initiatives is the work of Winy Maas and the Ph.D. Research of the Spacefighter Group, a collaboration between Berlage Institute, MIT and cThrough (Maas, Graafland, Batstra, van Bilsen, & Pinilla, 2007). While using the fundamentals of game design, the Spacefighter Group was far more interested in the field of game theory, understanding the possibility of predictive models of social behaviour by

the study of payoff matrices. The team developed several simulation games, but none intended to reach a broad audience or engage the public in the design process (Maas et al., 2007). The potential of games, to this extent, has been more closely related to a multi-actor simulation research, remaining far from the hands of the public. However, this is not the case in other fields. The work of David Baker and his team on video game research has produced games like Fold-it and Eterna (Cooper et al., 2010). These games provide accurate simulation models of molecular processes like protein folding or RNA design. By opening these simulation models to a large audience, the team of scientists expects to involve the audience into a crowdsourcing challenge, where any player can provide a solution for a given problem. Baker understands that human experience and intuition can be coupled with the rulesets of a game environment, providing a learning experience for a player that might not know anything about molecular physics (Cooper et al., 2010). This educational component can allow mastery, where players can engage complex scientific challenges and aid scientists in the development of the cure for diseases.

Baker's crowdsourced model relies on building an accurate simulation that can have real-world implications and nurture a community to propagate knowledge or design patterns that seem effective. His model uses games as a design platform for data gathering, and games as a form of design labour performed by thousands of individuals. While this research might seem incredibly prosperous if the scientific progress is kept in the public domain, a scenario can be envisioned where the free labour of players could contribute to the design of proprietary drugs by pharmaceutical companies. The challenge therefore of designing a platform where


thousands of players can contribute to the development of knowledge, is to define who becomes the owner of such knowledge. There is a fundamentally different attitude between designing a tool where multitudes collectively participate in the construction of the commons, and an extractivist digital platform that capitalizes on data collected from users.

PLATFORMS

The medium of games has demonstrated to be conducive for the generation of design platforms. Games like *Minecraft* have effectively created a form of social network allowing players to create a myriad of experiences for each other. But for the field of architecture, to develop an architectural design platform, there are several challenges to overcome. The first issue is the problem of privacy and ownership. A player can develop content in a game environment without realizing that the production is valuable for urban studies. The monetization of user generated data by platforms such as Facebook or Google is common practice, as the service is offered free of charge. The user agrees to the conditions to provide aggregated data to be used for advertisement or any form of machine learning problem. While the conceptualization of an architectural design platform might decide to follow such a model, it is important to reflect on the underlying ethics implied.

What Nick Srnicek (2016) calls 'Platform Capitalism' is a warning of how the emergence of 21st Century networks have become a mechanism for the concentration and accumulation of power, reinforcing inequality. A game platform that uses the free gameplay labour of its users to generate architecture content is something that should be ethically rejected and denounced. Alternatively, a platform can be designed in such a way not to

extract value from its users but rather to foster the ownership and appropriation from the content generated. What Trevor Scholz has denominated 'Platform Cooperativism' (Scholz & Schneide, 2017) is a network infrastructure that supports the production of a common pool of resources in terms of value or knowledge. The 'production of the commons' is perhaps the biggest opportunity and challenge for a multi-user network, especially if it is dedicated to the design of urban patterns. A collaborative network needs to generate a positive feedback loop between its users and the value of the network, defining crowdsourcing as a protocol for the contribution of user-generated value and not as a form of free labour harvesting.

The architectural field is very familiar with the exploitation of free labour through the mechanism of architectural competitions, so there is a real danger that gaming platforms will become a tool for neoliberal exploitation. However, it is precisely online participatory platforms that can also break current trends in the discipline and develop a new digital infrastructure for the production of the commons. The emergent urbanism enabled by a gaming platform such as *Block'hood* seeks to engage audiences from a young age to participate in the construction of the city. Far from master-planning initiatives and decisions behind closed doors, *Block'hood* offers a piece of digital infrastructure to re-ignite the social imagination and utopianism for city building. By providing a medium and perhaps a file format for explicitly sharing design patterns, the project reinforces the knowledge propagation believing that later generations will need such tools to develop a deeper systemic awareness in design. 

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