

Design-Through-Production: Towards a Humanist Position

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ABSTRACT

This paper will examine the necessity for shifting the discourse towards a more humanist perspective in light of the application of digital design-through-production techniques. It will demonstrate an ethic for production, informing form, and provoke a call to carefully examine the nature of architecting solutions to contemporary problems.

KEYWORDS: design-through-production, humanism, architecting, collaborative design.

We are entering a new era in design-related disciplines. In earlier decades of “computer-aided design in architecture” scholars critically developed and examined our first ability to generate lines and solids in the computer, leading to grand speculations about a computationally-based “architecture machine” for generating buildings (Negroponte, 1970). Eventually digital techniques led to a grand era of representation with nearly photo realistic renderings of envisioned projects. Over the decades of the aughts, it became increasingly possible to feed data directly into the manufacturing process in order to realize projects at all scales of building. In architecture, and its allied arts, projects have emerged that take full advantage of new digital methods of production. The effects are seen at both the generative and production end of the spectrum. On the generative end, radical new forms and orders have been formulated. On the building production end, a retooling of the fabrication and construction process bypasses traditional forms of construction and assembly. Digital manufacturing, data management, and software all facilitate this process of collaborative crafting of information and production. Are we now closer than ever Negroponte’s “architecture machine?” If so, the very nature of design is called into question,

and begs the question: what ends do we serve? We can optimize an algorithm to provide efficient particular solutions, however, in the end, humans are responsible for selecting the proper formulation for a given set of parameters. As such, a humanist perspective should be central to the conversation about digital design-through-production.

Ever since the topic of design and digital fabrication in architecture surfaced in sibling organizations such as ACADIA, ECAADE, SIGraDi, and CAADRIA (albeit as latecomers to the earlier conversations forged by the transportation and industrial design disciplines), the discourse has thrived as a productive strategy for advancing the discipline. Clearly, new maps have been charted in architectural discourse that will steer us toward a promising future. However, deeper examination of much of the scholarly work in this area tends to focus more distinctly on the technologist position. Beyond developing skills to serve new methods of design-through-production, we must question what ends this methodology serves. This writing is an attempt to outline potential conversations inherent in a design-through-production methodology by examining an ethic of production at regional levels in light of the

ocean of global information access, and the underscore the responsibility of human decision-making in the formulation of form inherent in digital design methods.

We are presently in an era of transition...

Architecting.

Information is ubiquitous. One may now take courses through online programs without ever stepping into a classroom, or further, may develop skills without ever enrolling in a course. It is easy to supplement one's education through online presentations and tutorials readily accessible on the internet, in many cases for free. This fact, poses many new challenges to a highly regulated professional career, and agitates the nature of the discipline of architecture. What does it mean to be architecting a project? Wasn't Carlos Scarpa, who never received a total formal education in architecture, architecting? Today, digital designers are architecting parameters through digital means and examining the realities of production. Still it is illegal to call oneself an architect without the proper credentials. As technology shifts and affects society, we ought to consider what credentials will lead us to the most effective future in the discipline.

Beyond the discipline, civilization has clearly been affected, as always, by shifting technologies.

Today, we purchase items without ever visiting a store. We can now define friendship by clicking an accept button, and erase these connections exactly the same way. We may read major works of literature or novellas without ever touching paper. At the intersection of space/place/time and technology, time collapses, space collapses, commerce collapses, language collapses, friendship collapses—or perhaps everything collapses and expands at the same time (except for our human nature). Clearly we are in a great period of transition, however, our human nature remains unaltered?

In architecture, innovative strategies of digital communication and technological production have led to completely different languages of space, form, performance, and order. Technological advances affecting design thinking may be applied to any era of architecture. Thus, to unlock what is particular about our contemporary condition, we must deviate from the technological discourse and deal most specifically with the implications of a global shift of information. We must examine closely these interwoven hidden dimensions that are at work today, more so than traditional notions of space, proportion, order... Just as the book killed the cathedral, and the Renaissance forever transformed architecture, information is affecting our world, and the notions of physicality, space, time, and place in architecture will never be the same.

In the end, what has not changed is the need of human beings to connect. Architecture is an interface—an edifice that leads us to deeper connections. As such, effective architecting becomes the great new potential for restructuring our world. As our techniques for representing and formulating design solutions evolve, architecture will manifest itself in significant new ways that we are just now beginning to understand.

Rebirth: The Age of Humanism

The Medieval era was replaced by a carefully constructed (and funded) rise of the merchant class, banks, rebirth of arts and architecture, and a simultaneous celebration of the human condition. The Renaissance also sowed the seeds for a modern civilization, meanwhile ushering in the great age of humanism. Simultaneously, innovations in technology and technique encouraged new ways of envisioning architecture.

Techniques in representation developed with the invention of perspective and aerial perspective. Media in painting shifted from egg tempura (flat) to oil-based (subtle) paint. Subjects moved away from symbolic representation, and collapsed temporal scenes, to a more accurate rendering of real scenes and space. Literacy spread through the masses, shifting attention to gaining knowledge from the image to the textual. To understand how envisioning architecture during these time periods, I examined a particular case of the paintings of "the Annunciation" in Italian Pinacotecas. In particular, I looked at how this famous scene evolved from the late Medieval period through the Renaissance. The stylistic shifts in painting over time reveals as much about shifting techniques in painting, as it does both shifting attitudes about architecture and cultural values. In summary, the narrative depicts Mary on terra firma (typically on the right of the picture plane), and Gabriel (typically on the left) bringing the message (always from above). This tripartite structure is consistent in almost all renderings of the scene until later when the above dissolves into sky and the focus clearly is on the space and scene on the ground plane. The "message from above" varies from beams of light, to birds descending from windows from heaven. Gabriel's message is typically a gesture, or a divine radiation, but later in Sienna became actual text "Ave Maria" on the canvas—reveling in the new literacy of society. Mary is almost always situated at a threshold between building and nature; between inside and outside. She is typically seated with a book, studying, on the terra firma. In many cases, she is at podium, on a platform, on a porch, and sometimes with a door ajar revealing her bedroom. Essentially, Mary is almost always depicted as being enshrouded by architecture in some form or another. As we examine the elements enveloping Mary, we can clearly see a shift in the attitudes about representing architecture, and architecture itself. The invention of

perspective gives a new gravity to the scene, and leads to a more precise articulation of all elements that compose architecture. I would venture to say that the articulation of architectural elements was privileged by the necessity to render buildings towards a vanishing point! Da Vinci's Annunciation may be seen as one of the best realizations of a new architectural understanding during the Renaissance—and a new attitude about the human perspective. The scene is depicted in full real perspective, uses aerial perspective, and takes place entirely on the ground plane. It is almost photographic in this sense. All additional symbolic representation has evaporated in the gravity of this scene. Da Vinci's Annunciation depicts, by far, the most human-like Gabriel and Mary with attention to the facial features and emotion of that moment in that space. Even the natural setting beyond the building is brought into full order as a manicured landscape. Through this image, it is clear that society had a new human perspective of order in the world.

Clearly, architecture evolved through techniques of representation during the Renaissance. Yet, one of the unintended consequences of these new techniques was the separation of envisioning buildings and making buildings, as the “master-builder” gave way to the “architect!”

De-Naissance? Or RE:humanism?

In light of the influence of information technology on how we envision designing and making buildings, and moreover, its influence on society, a humanist position must be included to the discourse as we engage complex, interrelated, multidisciplinary solutions to contemporary problems, and we restructure how we design for present conditions. Computation has led us to determine new fields and conditions of operation, but adjusting parameters without practical human application will somehow leave us feeling more like we live in a techno-computationally optimized world. Now that our smart phones have more capacity than the command module that went to the moon in the 1960s, one would expect that we could serve a great good while making a giant leap towards advancing our civilization. We must more closely examine the ways these technologies can be deployed in service of humanity. Steve Jobs of Apple underscored this necessity for the human application of technology in his Apple Keynote on March 2, 2011: “It is technology married with liberal arts, married with the humanities, that yields us the result that makes our hearts sing” (Jobs, 2011). In a recent roundtable conversation at our university, Biz Stone, co-founder of Twitter asserted that: “altruism is the future.” Let us shape our technological world guided by ethical muses.

Where then is humanism today? Updating our profiles? Consuming? Producing? How do we foster celebration

of the human mind and spirit by architecting? Processes are more open, and participatory, yet we seem distracted by participating in brief automated surveys about our satisfaction—intended to aggregate trends—rendering the voice of individuals as those who input information only to feed an insatiable information aggregation. Are we just constructing a digital tower of babble? We all do data entry now, drained from surveys and reports that take away from doing the real work.

My input is affecting my output.

Terminology

New methods require new vocabularies. One significant forthcoming project attempts to provide a lexicon for architecting in light of digital influences crafted by Greg Luhan at the University of Kentucky with input from digital design leaders around the world (Luhan, 2013). The following paraphrases some initial defining contributions to this interesting project, and hopefully illustrates further the playing field for new technological methodologies.

Digital notes refers to our ability to record analyze and synthesize information through a variety of media techniques. The observation of the physical world may be noted, recorded, and augmented using applications that reveal hidden relations not easily recorded in traditional sketching or photographic techniques. The ability to effectively synthesize data is the key strategy of digital note taking and this information may feed directly into envisioning solutions for a particular set of conditions.

Design through production refers to a process that incorporates all aspects of a total digitally informed and fabricated project. Its roots are tied to the notion of “total design” developed during the Bauhaus. Essentially, information about a building's production and performance is necessary in order to strengthen the evolution of the design. As such, informing form implies digital fabrication techniques and these feedback loops are critical tools for accomplishing a design-through-production process.

Digital fabrication refers to the process of developing and translating information from modeling software into computer controlled production. This technique involves everything from scripting, modeling, optimization, and material fabrication. The process of digital fabrication typically involves multiple iterations, prototyping output, critically examining failure, and constant revisions resulting from the feedback of iterations.

The feedback loop is not a new term, but refers to the process of adding value via the digital exchange of information. Multiple collaborators assemble around a project, many times remotely, and each participant

contributes information to evolve the design strategy. Feedback loop not only refers to people adding the value but rather information informing a project. Feedback from material, structural, acoustic performance, for instance, may also add design value through the feedback loop. The primary attitude for feedback loop is to be open to experimentation in order to develop deeper solutions through critical failure, which will eventually lead to success.

Digital exchange refers to the value added transfer of information amongst a collaborative. Each participant adds value to a given project by weighing in to a particular data set. The exchange is devoid of any platform or software, but rather focuses on information using a variety of communication and organizational strategies.

1) Connect globally | Make locally: an ethic for design-through-production.

One strategy for deploying methods that affect the human condition is to search for local conditions throughout the design-through-production process. This strategy was more thoroughly outlined in a previous paper presented to SIGraDi in 2010 (Klinger, 2010). In this global/local way the building can affect the labor and local conditions around each project. Similarly, on grand scale in the medieval era, the building of the gothic cathedral involved the entire town and gave an economy around the building enterprise. The design-through-production approach to projects may be applied to any region and any particular local conditions. Connection to the global stream of information about digital design techniques and skill-sets, can enable conversations about new methods that may be examined by local industry partnerships, even if they are not particularly technology based. Regional partners invited to the feedback loop during envisioning a project add specific value of applied research and production; bringing industry partners into the collaborative early adds tangible and practical value to the design process from the outset. A demonstrable contribution to serving the region is clear by the affect of research and development with these industry partners, both in methodology and in production. No matter the region, there are established cultural and industrial processes that may inform and be informed by the exchange. Further, regional case-by-case examples further augment the knowledge base.

2) informing form

“We enjoy the fruits of the plains and of the mountains, the rivers and the lakes are ours, we sow the corn, we plant the trees, we fertilize the soil for irrigation, we confine

the rivers and straighten or divert their courses. In fine, by means of our hands

we essay to create as it were a second world within the world of nature”

--Cicero
De Natura Deorum

Designers are faced with the responsibility to design something that will effectively have a relationship with the physical world and connect to us deeper understanding of the relations of things. Today, new forms in architecture are brought on by the ability to inform performance and measure/optimize conditions before we actually build. We are immersed in a present, which has the potential to stimulate a shift in production (physical and cultural) as significant as the shift from the late medieval period to the Renaissance. Traditional disciplinary boundaries and methods are inadequate to engage a global society that has already been affected by information technology. In today's global connectivity, communication is central, and critical team-based thinking and decision-making skills are most necessary.

We endeavor to provide order to the world by creating our manifestations of our own human understanding of the world, which has particular patterns related to what we privilege as a society. Today, we use computational devices and algorithms to formulate strategies for forming our physical structures. In the end, however, are we any different than the Greeks who decoded nature through measurement and discovered a secret code in the golden section, which would ensure harmony of every part to the whole? Humans still need to select which parameters to privilege, and in many cases, performance is optimized, *ceteris paribus*. If all other relevant things, factors, or elements remain unaltered (MW). By holding all else constant, we can effectively optimize and inform formal strategies one parameter at a time, which helps our selection process; we must hold parameters static and examine all of the properties one by one through this diminution of the observed. But, the world is much more complex. Multiple factors are inherent in each design problem, and strict disciplinary solutions lead to a minimization of these other factors. Strong design solutions include multivariant factors of influence, *mutatis mutandis*. With the respective differences having been considered (MW). The key to this argument is the “consideration,” because in the end, a human or collective makes the selection. Thus, human aims will always be central to the conversation regardless of technological means and methods. Here is the crux: humans make the decisions about what to privilege and what to deny. In our professional strictures, where do we learn to develop the stewardship of this great responsibility? Up with the human perspective!

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