

# Re-Tooling the Logic of Design

Maria Vera<sup>1</sup>, Jonathon Anderson<sup>2</sup>, Ming Tang<sup>3</sup>, Shai Yeshayahu<sup>4</sup>

Southern Illinois University Carbondale<sup>1, 4</sup> University Of North Carolina Greensboro<sup>2</sup>, , University of Cincinnati<sup>3</sup>

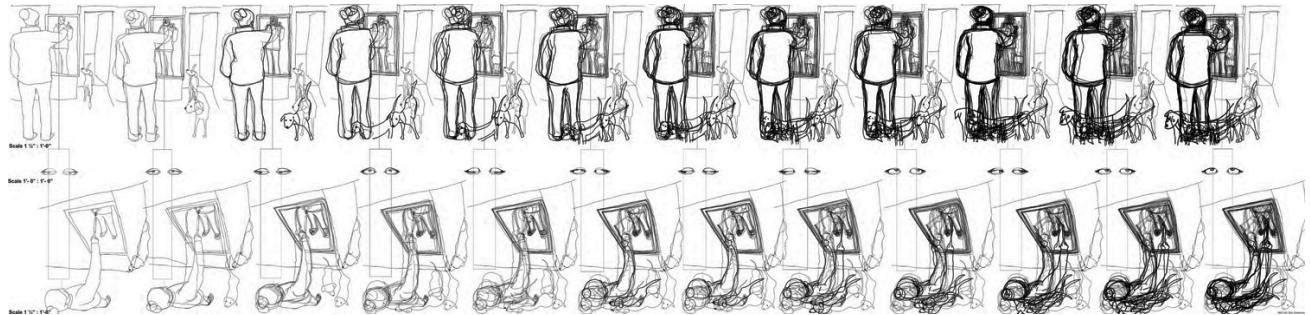


Figure 1: Production of hand drawing using vector base software<sup>1</sup>.

## Abstract

Learning processes in our schools are eroding according to Chris Dede, the Timothy E. Wirth Professor in Learning Technologies at Harvard's Graduate School of Education. Dede believes that these erosions are due to educator's lack of vision and interest in implementing immersive tools like those used in gaming, YouTube, life blogs, and online podcastings inside the classroom.<sup>1</sup> Conversely, Trip Gabriel's NY Times Global Edition article "Learning in Dorm, Because Class Is on the Web" heralds that these are pivotal times when the role of a typical classroom at certain universities translates to online classes which relinquish teaching to the virtual world.<sup>2</sup> These two distinct views about the state of education are enticing for beginner design educators that seek means of rethinking the basis of current pedagogic palates and wish to transcend teaching about the object and, instead, move toward re-tooling how-to teach the logic of design.

Within this quest and by tracking the educational history of architecture, we understand that there

lies a wealth of evolving spectrum, tools, and techniques within design teaching, which can perpetually advance the learning, teaching, and practicing processes of our discipline. This is true in that architecture is not simply a discipline, but, rather, is a large community of creators driven by the desire to contribute to the cultural advancements of mankind. Our profession thrives when we stand abreast of the times and seek the means to apply tools and technologies in ways that contribute to the furtherance of our existing living conditions. For this reason, the first and most visible state of educating an architect rests in the design principals embedded within beginning design studios. Thus, we ask, how can we submerge ourselves in teaching methodologies that compel students and faculty to use the techniques of our times in ways that innovative means for *re-tooling the logic of design* become apparent? In answering this question we consider that all transference of tools and technologies lead to momentous changes that are of great importance to architecture. Thus, our paper will delineate the teaching inceptions and struggles faced by a community of educators that are currently implementing new specifics for re-tooling the methods of teaching beginning design

fundamentals. This paper describes the first attempt to exhibit a network of pedagogies founded by several educators from different academic institutions that share one common goal: finding ways for the beginning design student to actively engage in developing design processes using technologies and thinking logistics as tools that promote cognitive protocols. Primarily, we believe that the current state of the discipline demands expertise in areas such as scripting processes, fabrication techniques, and adaptive components. We will discuss the beginnings of a teaching methodology where the tools and technologies of our times are of foremost importance in helping us to introduce the parametric mindset to beginner design students.

## Introduction

Our discipline is bursting with design nomenclatures credited to a selected few; an exclusive lineage of this network is visibly tracked across specific schools that influenced the design revolution of the 20<sup>th</sup> century. A decade into the 21<sup>st</sup> century, we are still experiencing the latest translations of this effort, for this reason and in this tenuous climate, design educators remain resolute to grapple with student's impetuous stimulus often arguing that great design is a matter of cognitive processes and that cognitive processes take time. Thus, time is at the core of this argument because we are quickly realizing that the logic of design and design processes are at the opposing spectrum of pedagogy.

Design is always in a state of flux, flexible and receptive to "radical" thoughts while pedagogy remains meditative, absorbed in technique and procedures. It has lead educators to discard or embrace impetuous work and whim in ways that distinct design expertise flourished. For instance, in the late 1980's, educators like Nicholas Negroponte, Bernard Tschumi, and John Hejduk seemingly understood these differences and distinctly sought the means to articulate their pedagogic strategies in specific ways. Furthermore,

they acted on the means and methods with which to actively contribute and enhance new knowledge into the discipline of design. We highlighted this moment at the 2010 NCBDS—in our presentation *The Hand, The Eye and The Mind Make That* — as the definitive point in design education. We feel that the period signified the end of the trickling down effect where design educators would ceased to inflict in student the specificities for design explorations and when new modalities of thought and process would widely emerged as immersive tools and the spread of communication proliferated across people, places, and things.

This idea is clearly articulated by Matt Riedly: "it is our habit of trade, idea-sharing and specialization that has created the collective brain which set human living standards on a rising trend --because ideas are having sex with each other as never before".<sup>3</sup> The problem then is for design educators to assimilate the transition and engage in making it possible for beginning design students to understand the logic of design and academic goals in a timely manner. It brought us to confront the reality that design is not meditative; it is harnessed in real time and made possible through the development of synthesis. Under this scope our goal is to ignite a collective undertaking for design faculty to contribute critically and engage in discovering adaptable pedagogies that infer in the logic of design.

## Re -Tooling What?

*Re-Tooling The Logic of Design*, than, deals with the involvement of four educators engaged in an ongoing collaboration that aims to investigate and cross-examine the pedagogic principles and cognitive relationships between teaching how-to think in a design manner from a prescriptive method which contributes to the logic of design by learning how-to synthesize data in non-prescriptive ways. It's a cognitive switch that breaks the mold of *learn establish skills to learn from establish skills*. The difference is paramount as we quickly realize that

the logic of design, in regards to space making, surpasses didactic formats concerned with the tutelage of one mastermind and limitations of program, scale, or tectonic language. Without detracting from the need to know skills, immersive technologies allow us to collectively reformat and reconfigure the means to deliver the knowledge embedded in existing skills. We are not seeking to embed finality in process or literally transfer specific skills, we are engage in discoveries and to promote a counter effect of adaptable paths where teachers and students learn how-to reapply skills in parallel, sequential, and non-sequential spheres. Our interest, therefore, lies in developing a flexible studio-learning environment.

### **Networks and Expertise**

Why is this necessary? The ability to access information transcends physical barriers and enables disperse machines and individuals to link and organize regardless of time and place. Research and coordination are now pertinent and specific to knowledge and expertise in the same way that design is specific to specialized subjects, objects and different types of technological processes. Hence, the most valuable opportunities we are engaging in rise from the ability to synthesize in a decentralize manner without a singular mastermind, director, or principal educator to claim ownership. Gone are the days when the designer focused in site specificities, scale, context, and alignment to determine space. For this reason the tools moving us forward are as Manuel Castells points out in *The Rise of A Network Society* [1996], a network-logic, which we understand to be a design system of complex and broad organizations that are only possible by linking multiple frames of thought in seamless of ways. Yet, these design environments can become banal and untraceable, unless observations and critiques are focused, encapsulating specific developments, and providing details for customized synthesis to occur, allowing expertise to flourish.

Thus, we asked — how can we integrate the logic

of design in the curricular agenda of beginner design students and how do we institute modes to argue cognitive processes through parametric thinking? For us the answer is manifold and based in networking. Our team ignited studio collaborations from three disperse locations sited in the Midwest and Southeast coast of the USA. We opted to engage in research activities using immersive technologies in ways that we did not imagine ten years ago; openly, by working collectively in objective problems and by strengthening our teaching through active participation. We stressed the potentials that lie in monitoring; such as revisions, observations, and coherence of synthesis. This allowed us to see beyond the specifics of a technique and to adhere to the overall purpose of our involvement.

This collaboration began last summer when we further developed two exercises and set the basic fundamentals of parametric thinking in motion prior to the beginning of fall 2010. In doing so, we recognized that our planning processes were similar to co-teaching in that we were planning what to teach yet, our goals posses an added caveat, to place emphasis in assessing both our teaching methods and the students processes in real time, via skype. Throughout the semester we aimed for an open policy allowing all of us to visit student's work by accessing studio's blog and downloading podcast in order to objectively establish standards and critique both the delivery of instructions and the students learning processes. Currently, we are in the process of mounting *on site exhibits* at each university. This will provide us with an added lens to synchronize the occurrences and grasp the outcomes of our first semester. We will discuss and review the different stages of production, format graphs, and charts using google editing. We have the ability to simultaneously note the differences and similarities in accomplishments as they emerged in each studio during student pin ups and final reviews. Ultimately, by fall 2011 we seek to improve the timing of delivery and further our goals to teach the principles imbedded in the logic of design.

### Integrating Integration

During fall 2010, students were charged with a simple task —look at your body and pick an idle position as the basic value to initiate an intensive and precise mass production of drawings. The goal, they were told, was to see each still as a single unit and independently analyze and snip units into bits and pieces, which form organized instances. To engage in understanding the potential each still conjured and seeks ways to reorganize the settings and reformat the images like algorithms in countless of alternate dispositions that generate multiple settings. In synthesis, students learned simple ways to reassemble and develop scripting skills by looping and conditioning different points of views in parametric format. They engaged in basic algorithmic process where the focus was on adding, subtracting, and regulating data according to selected movements. At first, the task of determining and editing stills seemed daunting. The mass production of drawings was a stressful undertaking yet soon they realized that these are doable endeavors and a matter of organization. The work demanded understandings of repetition, amplification, and frequency; at last they got it. Ultimately, it was about duration.

Of course, when three different educators deliver instructions to three different studios at different universities, the exercise and the results yield multiple variants. For instance in one studio the professor instructed students to combined analog and digital processes as they observed and documented. This studio-produced hand crafted flow charts and documented processes in photographic format which were later translated to a production of hand drawings and then re-drawn digitally using vector base software [Fig. 1]. But another professor approach the assignment from a purely digital stand, requesting each student to produce a series of films and teaching them to alter backgrounds and foregrounds using digital programs which bypassed all hand drawing processes [Fig. 2]. In addition the third instructor decided to use motion-capturing devices and

students had to deal with understanding computer generated graphs and numerical data. The beginning design students had to learn how to decipher the nodes in space to produce drawings [Fig. 3]. Each of the above approaches rendered unique modes of thought and set diverse parameters for cognitive development, which brought us to understand the variables of understandings, and made us attentive to the method of delivery for the following exercise.



Fig. 2 [JA] Blakeni Walls

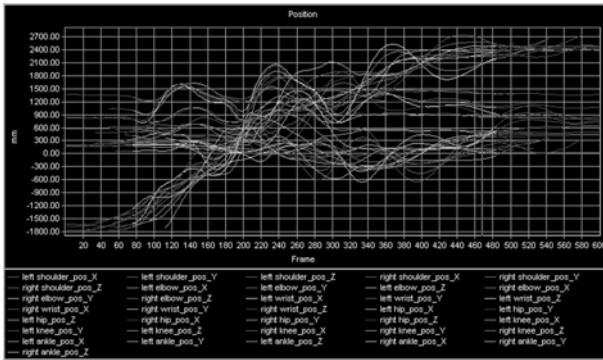


Fig. 3 Raw data from motion capture software.

We had presupposed that learning had to happen in just a certain way and realized that educators, like students, must learn to synthesize processes and softly engage in discovery. Our second assignment required emphasis in the basis of parametric thinking using simple algorithms notably found in origami folding. The goal was to learn how to produce clear and instructive flow charts in order to detail a process of motion using configurations that could yield alternate outcomes. The delivery of instruction was strikingly similar in all studios yet the outcomes were surprisingly different. Students who learned to observe and document using both analog and digital formats had difficulties generating rules and instead develop flow charts to assemble each unit [Fig. 4]. Students from the fully digital studio developed systematic grids [Fig. 5] and students exposed to the understandings of motion capturing data using digital monitoring equipment render elaborate abstract systems [Fig. 6].

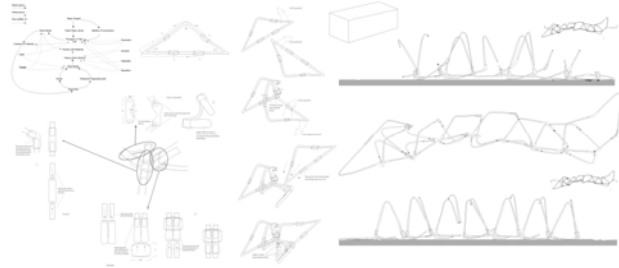


Fig. 4 Flow charts and its relation to assemblage<sup>ii</sup>.

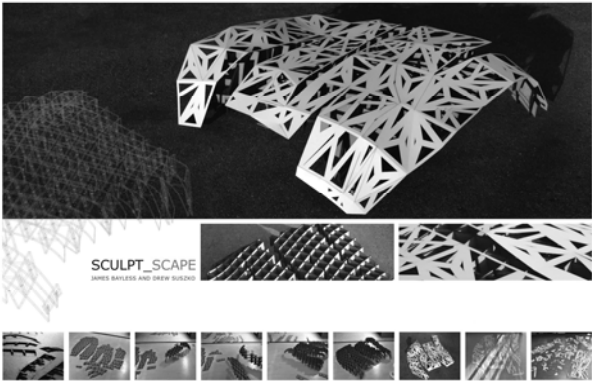


Fig. 5 Systematic grids<sup>iii</sup>

During the parametric tectonic study, the design team embraced the contrast between the regularity of the waffle grid and the irregularity of the contour.

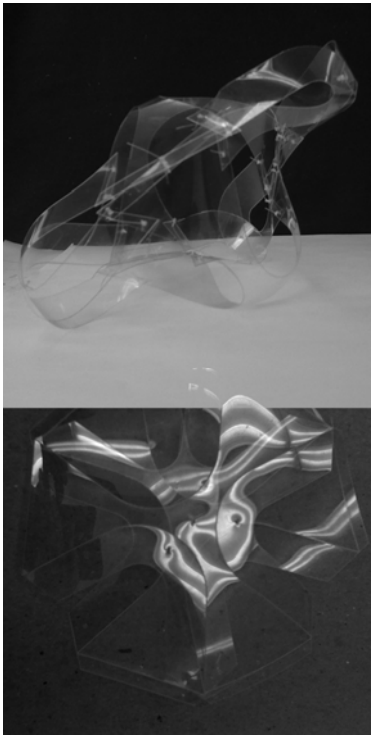


Fig. 6 Abstract system that explore how variables such as material and geometry, can be affected by light.

### The Future of beginning design education

Undoubtedly, we are drifting away from what was once the staple of the design studio —the end of the semester exhibitions when educators, visitors, and students walk around studios assessing the work of others and providing meaningful inputs for further discourse. Our present teaching-learning format is perpetually open for “walkthroughs” where we are engaged in an open source environment that lends itself to constant analysis, collaborations, inputs, and debates. It provides deeper modes of synthesis. Data and links of bits and pieces become fruitful ways to visit and revisit the work. As we develop joint paper presentations and exhibits of the student’s work we are furthering our observations. These processes are strengthening our teaching approach at greater speed, allowing us to quickly engage in meditative analysis that alters our ways to slow or accelerate the pace of how beginner design students experience curricular changes, objectively and based on a collective point of view. Finally, it empowers educators to extend outside of their

physical surroundings and to observe and discuss student’s cognitive processes as part of an emerging pedagogic pursue that embraces the logic of design.

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<sup>ii</sup> Christopher Borges and Ryan Henry Southern Illinois University at Carbondale, Fall 2010.

<sup>iii</sup> James Bayless, Drew Suszko, digital board composition, ARCH512 University of Cincinnati, 2010.