Abstract:

This paper focuses on the use of media hybridization to facilitate "emergence" in all phases of the design process. Designers can become more active interpreters of their architectural representations by recognizing the fundamental differences between the wide range of available representation tools including manual drawing, physical modeling, and digital modeling. Reconciling this spectrum of tools can assist the designer in navigating the threshold at the physical and virtual realms of design, and encourage more richly layered design solutions.

Body Text:

Media and representation tools used throughout the design process are not neutral players. Media used in the study of architectural problems can assert influence over the conceptualization and development of form. The late Thomas Schumacher offered an anecdotal illustration of this concept:

> It should be no surprise that the National Gallery East Building was the product of numerous study models made at all scales in the Pei office. The one thread that wove between these iterations was that all of the models were built out of foamcore. You need only look at the building to recognize the affinity with the medium used in the design process.[1]

In the 1980's, Michael Graves' designs for the Portland Public Service Building and other projects of that era were conceived in gouache and colored pencil. Many have noted that the buildings are enlarged versions of their gouache and colored pencil progenitors. Even today, one hears architects talk about the impact of digital media on architectural form. Remarks such as "That's a SketchUp building" or, "There's an example of a Revit design," are not uncommon.

---

[1] Schumacher worked in Pei's office, and had the opportunity to see the East Building while it was being designed and recounted this anecdote many times to his colleagues. He shared this perception with the author as early as 1983.

Multiple representation tools are available for use in the design process. While it is natural for individuals to develop proficiencies and preferences for one medium or representation type over another, using an array of media and representation modes can serve to broaden the designer's understanding of any given problem. Working across an array of media and representation modes can provide mutually corrective insights into a project over the course of the design process. The process of switching media can serve to de-familiarize the author with a given design problem (or aspect thereof), providing fresh insight into the strengths, weaknesses, or opportunities inherent in the tentative design solution.

Historically, representation tools have been associated with different phases of the design process. Soft pencils, charcoal, broad markers, and rough models have a long tradition in schematic design, while drafted drawings with technical documentation dominate construction documents. Studio culture of the last century would have almost universally rejected the idea of drafted drawings in the initial phases of schematic design because this form of drawing avoids ambiguity and offers less room for speculation.

Louis I. Kahn began the design process with soft pencils, charcoal, and malleable clay because at the start of a design process the ideas are not yet fully formed and the softness of the media allows the architect to create more explorative (even ambiguous) representations.[2] Kahn's process embraces the idea that the drawing is not merely an objective recording of an architectural idea, but that drawings have the capacity to be interpreted, even by the designer,

---

[2] Max Underwood, "Louis Kahn's Search for Beginnings: A Philosophy and Methodology." Circa 1987 (a paper circulated to the authors)

leading to a process of "emergence." Nigel Cross described emergence as "the process by which new, previously unrecognized properties are perceived as lying within an existing design."[3]

This paper focuses on the design process of a Master of Architecture thesis student who sought to hybridize manual and digital study tools. Initially the intent was to provide a stylistic consistency across representation modes. In the process, it was discovered that the hybridization techniques increased the tendency to move between manual and digital study tools, providing enhanced understanding of the design project. Finally, the introduction of "soft images" into the later stages of the design process, particularly in the context of hardline-digital media, served to increase speculation, interpretation, and fostered emergence.

Potential for emergence is limited unless designers can reconcile the diametric spectrum of tools for architectural representation. At the spectrum's origin, the hand sketch remains the firmly rooted vehicle for intimate human expression; at its far reaches, a vast array of digital technologies continually vie for their claim to relevance. The more invested the designer becomes in cross-pollinating this diverse toolset, the more richly layered his/her drawings can be. Utilizing the strengths of the aforementioned modes of architectural drawing, while being mindful of each mode's pitfalls, is a healthy way to structure one's design process.

Through all phases of design, the designer aimed for a more holistic drawing essence by championing a broad range of representation techniques (Figures 1-3). Paramount to our process was recognizing that each representation tool is *fundamentally different* in its inherent value for communicating design intentions. The crux for these differences is the threshold between the physical and virtual realm, which becomes more enigmatic every day.

---

[3] Nigel Cross, *Designerly Ways of Knowing* (London: Springer-Verlag London Limited, 2006), 55.

Muscle memory embedded in one's hands during the process of drawing or physical modeling is a tangible motive force, which can help a designer relate more intuitively to the eventual built form. Juhani Pallasmaa reinforces the innate imprint of the sketch within the human body:

> Every act of sketching and drawing produces three different sets of images: the drawing that appears on the paper, the visual image recorded in my cerebral memory, and a muscular memory of the act of drawing itself.[4]

The power of digital media to simulate virtual environments appears to be limitless. With this heightened capacity, comes a sharp decline in haptic potential. As Anne Friedberg observes, *virtual* is defined as, "possessing a power of acting without the agency of matter, being functionally or effectively but not formally of its kind."[5] The virtual realm situated behind the computer screen is a substitute for our own reality. The advent of virtual reality and instruments such as the stylus, have surely blurred these boundaries. Still, the overwhelming role of the hand in virtual manipulation is the monotonous click-and-scroll of the mouse: muscle movement that requires no muscle memory.

Our strategy for re-establishing a haptic sense and encouraging emergence at any design phase is to study the same concept using contrasting modes of representation. Created by

---

[4] Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture* (Chichester, UK: John Wiley & Sons Ltd, 2009), 90.

[5] Anne Friedberg, *The Virtual Window, From Alberti to Microsoft* (Cambridge, MA: The MIT Press 2006), 8.

superimposing colored pencil on trace atop digital linework from previous iterations, Figures 7-9 are reactions to the digitally generated SketchUp drawings (Figures 4-6).

The re-introduction of manual drawings into the digital context (Figures 7-9) allowed the designer to capture a grit and contrast, which reinforced the narrative of the project by introducing "softer edges." This process not only gives digital media a haptic sense, but the potential ambiguity introduced by the "softer edge" challenges the designer to become an active interpreter of his/her representations and permits otherwise unambiguous hard edge representations to support emergence.

Non-neutrality of design media allows the tools we use to assert influence over design choices, based on the inherent strengths of particular media. Layering pencil on yellow trace and superimposing these layers digitally to create varying intensities of transparency provides a more effective study medium for design exploration, particularly when studying lighting and atmospheric qualities relatively late in the design process. Hybrid media assisted the designer in decision-making that resulted in manipulation of spatial and light qualities as the scheme progressed (Figure 4 to Figure 7). Hybridizing digital media lent a haptic dimension to the later stages of the design process and encouraged the designer to perceive of each stage as a tentative (and thus changeable) proposition, instead of a final design solution.

Cycling through design media can also challenge the designer's framing of the representation. As the computer screen size remains a constant, the designer becomes fixated on a solution (Figure 6). In Figure 9, the perspective is reframed to include the protruding brick wall. An approach realized after the sketching-hand pulled lines through the previously rigid frame.

Traditionally, hand-wielded drawing tools have been the only media granted latitude throughout the entire design process. Digital forms of representation can also be used to help hone a narrative at times when a designer may be wallowing in too much vagueness. Figure 10, a plan-section collage, structured an ideal scenario for site progression early in the design process. The robust layering control of digital tools, paired with curated textures and surgical linework, allowed a high quality drawing to be drafted as a roadmap for further design.

Every design drawing is the summation of the process drawings undertaken before its inception (Figure 11). Even if the final iteration of a drawing is composed of one medium, the influence of the previously used representation tools can still be asserted. The precision of digital modeling, the fluidity of hand-sketching and the tactility of a physical modeling all combine to broaden the designer's perception of his/her own work, which in turn makes the work more accessible to others.

Figures:

Figure 1. SketchUp generated image (Drawing by author)
Figure 2. Physical model with digital underlay (Drawing by author)
Figure 3. Hand sketch with digital and physical model underlay (Drawing by author)
Figure 4. Interior perspective, SketchUp & Photoshop (Drawing by author)
Figure 5. Lawn perspective, SketchUp & Photoshop Drawing by author)
Figure 6. Landscape berm approach, SketchUp & Photoshop (Drawing by author)
Figure 7. Interior perspective, manual drawing overlay (Drawing by author)
Figure 8. Lawn perspective, manual drawing overlay (Drawing by author)
Figure 9. Landscape berm approach, manual drawing overlay (Drawing by author)
Figure 10. Plan/section collage, Illustrator (Drawing by author)
Figure 11. Master plan, manual drawing (Drawing by author)

Figure_1

Figure_2

Figure_3

Figure_4

Figure_5

Figure_6

Figure_7

Figure_8

Figure_9

Figure_10

Figure_11