The Space and Materiality of Drawing

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Abstract

A close observation will be made of how analogue drawing plays a role in the author's foundation year studios. Visual qualities of drawing are explored with tactile qualities. In a continuous sequence of morphing space, drawing is used to lead the design project from one stage to another by ways of expressive sketches and conceptual diagrams as well as transformational tools. In every stage, drawing qualities constantly elicit interpretations in space and materiality. Theoretical discussions are carried on in order to clarify the diagrammatic function of drawing.

Introduction

The term drawing can be understood in three variations of meanings: drawing as a noun which is the object; drawing as a verb which is the action of producing the object; and drawing as a verb which is the process of filtering intentions through both the action of drawing and the product of drawing.

As an object, a drawing depicts visual illusions of space and possesses material attributes within the medium itself. The former is the stories that a drawing tells while the latter is the vocabulary used to tell the stories. Therefore, the former is an inferred visual property and the latter is a physical property, because the different properties involved in the process of drawing engage various senses of both the person who draws and the person who views. In the case of creating visual illusions, such as depth, light, texture, and movement, a drawing is abstract. It makes the viewer's eyes and mind more active than other senses. On the other hand, a drawing involves the sense of touch, the mixture of medium, and the movement of the body. It integrates the viewer's eyes, mind, and body.

Most viewers, however, tend to engage more with visual illusions of drawing than with the tactile quality of drawing which is based on the sense of touch. As a result, the intentions filtered from the drawing tend to be abstract and conceptual. For example, a viewer talks more about the composition and semantics of a drawing than the movement of brushes and charcoals, the pressure applied, etc. (Two different levels). This is why a translation from a drawing to a 3D space is usually about the final composition rather than the process of how the composition is achieved. What is overlooked is the fact that drawing is a specific sequence of actions through which the materiality of the medium determines the production of drawing.

In fact, drawing is a process of making that involves the coordination among mind, eye, and hand. Therefore, the action of drawing is not merely visual and so the way we understand a drawing cannot be merely visual either. It involves intensive thinking and tactile experiences. The key points here are the consciousness of making and the crafts of making. The former point is about intention. When drawing, for example, one has to take control of his or her process of exploration. However, this does not mean that accidents constitute failure. In fact, the product of drawing cannot be pre-determined. When accidents happen one has to find strategies to utilize them. So, the consciousness of making is being conscious about what is happening, what steps to take, what results to expect and again what is happening, what steps to take, what results to expect. The three steps rotate as the making proceeds and the intention evolves. Drawing is as much a discovery process as design is.

The latter point, the crafts of making, can be a challenge to our fast paced world because crafts take time. The purpose of crafts is not to make a polished product but to invest time in digesting

the process of making and letting ideas emerge in such a process. The craft of drawing may lend itself to the exploration of the materiality of a space other than abstract space, not in terms of visual illusions created in drawing but in terms of the interpretations provoked by the density of drawing, such as such as pressure, interlocking, strength of connection and movement.

An Exploration

It is important to use drawing as a design thinking tool. It is even more important to use both visual qualities and tactile qualities of drawing to interpret, extend, and inquire of design concepts. This is the pedagogical approach demonstrated in the author's foundation year studios. Drawing qualities are taught in the context of a design project in terms of observation, perceiving, making, discovery, and conceptual statement. The dynamics of drawing is exhibited in the dynamics of the design process. Drawing mediates a continuous process in the author's foundation year studio.

The semester starts with a contextual modeling project. An object is designed in orthogonal composition to situate at the student's drafting table. Compositional operations are experimented with in this project while materials and joints are the key issues (Figure 1). Conventional sections and elevations are drawn after the design is finished. The hidden grid of the composition is brought to the front (Figure 2).

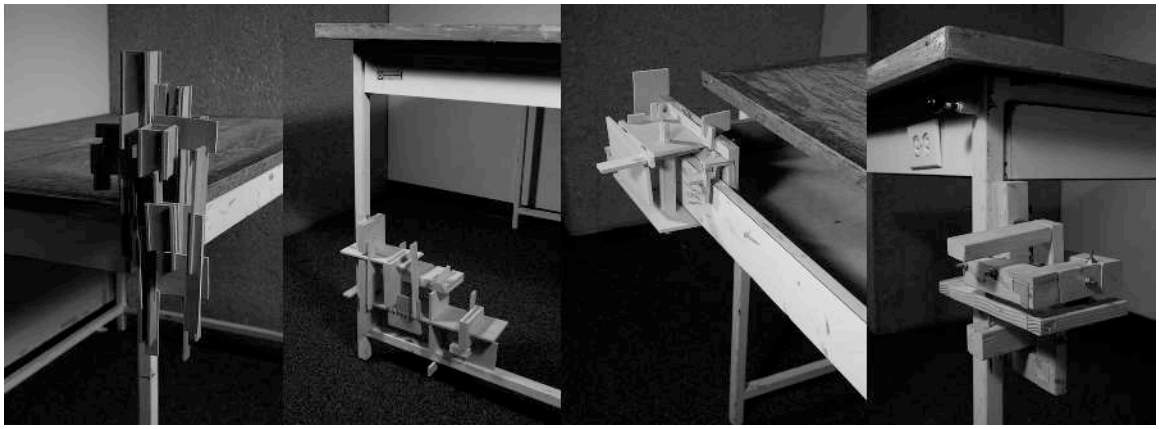

Figure 1. Table attachment

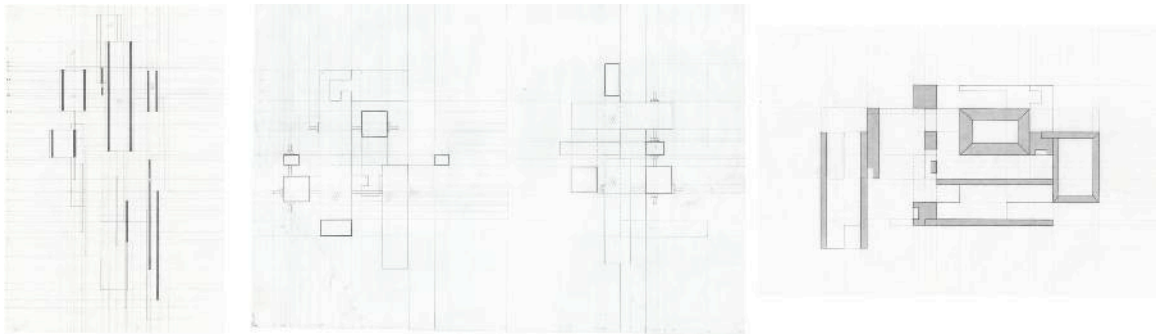

Figure 2. Sections

Students are asked to look for movements in a photo and use the movement forces to transform the orthogonal grid of the composition. The original sections are therefore skewed along with the grid. Not only do rectangles become irregular quadrilaterals but also the relationships among the shapes are tapered and even twisted. Based on the new composition, students build physical models to explore gravity impact of the elements. Materials and joints return as the key issues (Figure 3, 4).

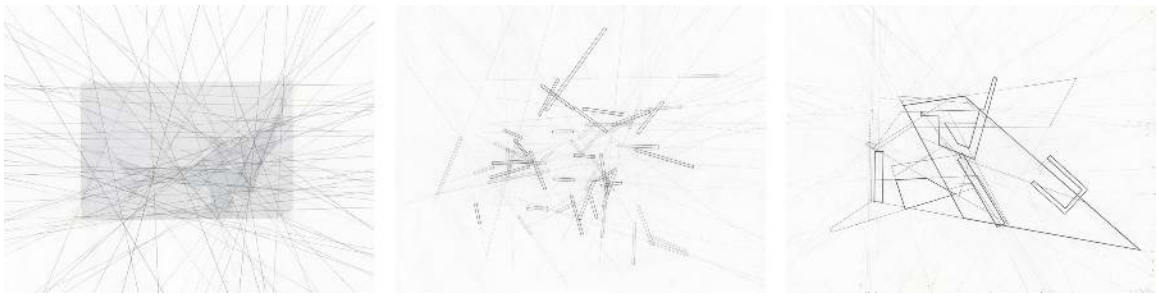

Figure 3. Drawing transformation

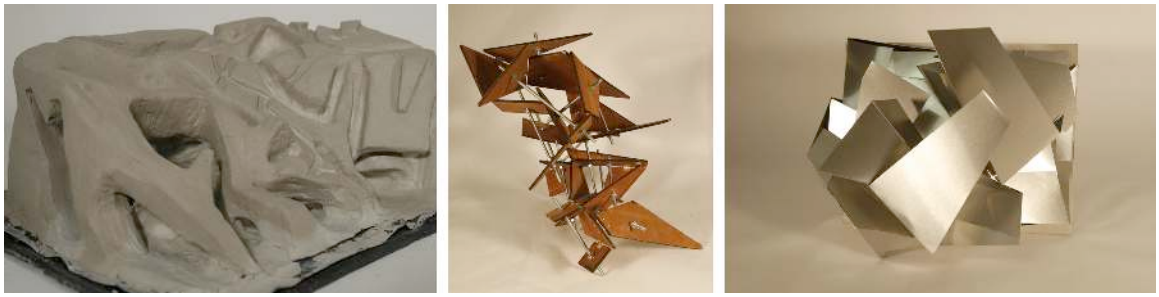

Figure 4. 3D composition

A site section is given to the students. They start to draw expressively using the medium to explore the impact of gravity, counter-forces, and actions and reactions. The visual aspects of these drawings are not given. Instead, they register formless forces, textures, and emotions. Students have to derive forms from their hand, arm and body movements, from the handling of the medium, from what is in their minds. Therefore, the process of creating these drawings turn into a design process that crosses the boundary between the non-visual and the visual (Figure 5, 6).

Figure 5. Drawing expression 1

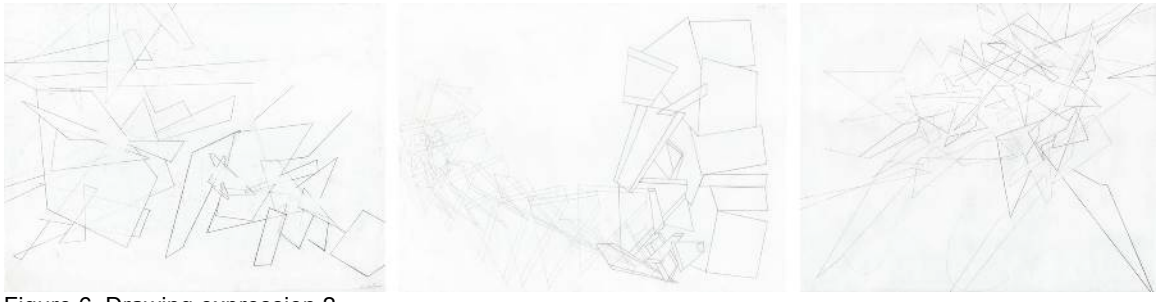

Figure 6. Drawing expression 2

Assimilating both the space and the materiality of the drawings, students build a walk-through space. The space expands on the site following the same principles, such as gravity, impact of counter-forces, and action and reaction, that are explored through the expressive drawings. Materiality is further developed in the medium of architecture (Figure 7).


Figure 7. Walk-through space derived from drawing processes

The process can continue endlessly as long as new contexts are provided. But what are the implications of such process? What are the roles played by drawings in such process? Being a transformational tool may be too general to describe the contexts of the transformations. The contexts situate the action of drawing a drawing and the action of drawing ideas from the drawing.

Action of Drawing

Although a drawing is meant to be seen visually the process of creating a drawing is unavoidably tactile. When one starts to drawing he or she immediately lays out strategies of drawing, such as how the drawing instrument encounters the paper, how much pressure it gives to the paper, how dry or wet the medium is, how speed is distributed, how movement is choreographed. An extreme example is blind contour drawing which illustrates how a drawing can be created by eliminating the role of the visual, only relying on the sense of touch. Drawing also creates textures on the surface of the paper. The texture is not a representation of something else, not a visual illusion, but the texture that the medium leaves on the existing texture of the paper.

In his book *Drawing and Perceiving*, Douglas Cooper introduces various ways of drawing besides achieving visual similarities with what is drawn. One exercise is to build mass with lithographic crayon. In this exercise, Cooper instructs the reader to position the lithographic crayon at the center of the page and imagine the crayon to be the center of gravity of the model. Then he instructs the reader to "build mass out from that center… Work as if packing layers of snow onto a snowball or layers of clay onto an armature" (Cooper, 36). When the process is completed the drawing is dark where the model is thick and light where the model is thin (Figure). This drawing process has more to do with weight and thickness than the appearance of shapes and forms. In another exercise, Cooper asks the reader to use charcoal and carve space. Where the space is deeper one has to put much pressure onto the paper to carve. Where the space is shallow, little pressure. The operation is literally carving. The result turns out to be interior spaces that are carved out or eroded out of a preexisting monolith (Figure).

If drawing can be produced in a tactile way it is important to see drawings in a tactile way, admitting that the visual plays an important role in sensing the tactile of a drawing. Regardless of shapes and compositions, there are elements that can almost be physically felt, such as weight, layers, thickness, roughness, smoothness, and even fragility and vigor. Further, within shapes and compositions one can also sense physical forces and tensions. Much discussion can be found in Wassily Kandinsky's *Point and Line to Plane*. Kandinsky emphasizes the inner pulsation of the work and hence the tension created among drawing elements. The tension does not exist literally. It exists, however, through how they appear to our eyes and how we would interpret their materiality in the physical world, basically thought the embodiment of the shapes. This is exactly what Wassily emphasizes in his article – the internal forces of drawing elements, the tensions living within these forms.

Intentionality of Drawing

The action of drawing produces various graphic qualities. Assume two equally skilled people drawing a shadow cast on a stone wall. They can produce different drawing qualities only by using different media. For example, the effect of a brush stroke differs from that of a pen stroke. If they both use the same media but different techniques, dry techniques of watercolor versus wet techniques, the effects are different. If they both use wet techniques in watercolor their drawings still cannot be the same, not only because the ways they apply these techniques would be different, or their arm movements may be different, but also because the coincidences of color mixing would play an important role in differing drawing qualities. Even if by an extremely unlikely chance all that we have just discussed were the same, the two people's differences in perceiving what they draw would reflect on their drawings astonishingly. The list of hypotheses goes on. Indeed the action of drawing has many variables that determine different drawing qualities.

Different drawing qualities can be the result of a process of conscious explorations or a sequence of aimless accidents. Therefore, it is critical that the action of drawing is carried on with consciousness. A distinction between charge and brief, drawn by Baxandall (1985), becomes relevant. The charge is the set of given instructions and specifications. It is composed of common requirements and circumstances. The brief consists of the additional intentions brought into the creative process. Therefore, brief is subjective.

What we have discussed in the previous paragraph is mainly circumstantial except that perception can be subjective. However, the intention of utilizing and elaborating circumstantial aspects becomes brief. For example, accidentally having a bleeding effect between two colors is a circumstantial effect but handling the density and thickness of two colors and putting the two wet side by side is intentional. Further, the bleeding effect can be used to achieve the overall composition of a drawing and to express feelings. This is when circumstantial aspects of drawing arrive at the level of conscious intention.

Intentions are not fixed. In the process of drawing it is possible to have a general intention at the beginning but impossible not to let the intention evolve. Drawing cannot be completely controlled. One stroke of dark tone may lead to the overall adjustment of contrast. In addition, it is important to notice what is happening in a drawing process and discover new intentions. Aimless repetition of strokes may lead to a whole composition of strokes following similar directions. Therefore, intentions are reflective.

Diagramming

The action of withdrawing ideas from drawing determines the process of drawing to be an intentional exploration of ideas rather than a representation of things that can be seen. It is the moment when drawing becomes a diagram. The most obvious difference between a representation and a diagram is that a representation is figurative while a diagram is not. The fundamental difference is that a representation is about what can be literally seen but a diagram is about what can be understood or metaphorically seen. Therefore, a drawing with graphic intentions can potentially be a diagram.

The diagram, an instrument born with architecture in terms of "the parti," has been drawing more and more attention from architects since the 1940s. A "diagram" refers to any 2-D or 3-D shape that is used to express a thought as a spatial construction (Peponis, 2002). Discussions on the diagram demonstrated its importance in architectural design with in publications such as Peter Eisenman's *Diagram Diaries* and a special issue on diagrams in *ANY* magazine in 1999. In Eisenman's definition, "a diagram is a graphic shorthand. Though it is an ideogram, it is not necessarily an abstraction. It is a representation of something in that it is not the thing itself. In this sense, it cannot help but be embodied" (Eisenman, 1999). In essence, a diagram is a design thinking tool which enables and stimulates the imagination of a designer and hence facilitates architectural conceptualization. A diagram is an instrumental technique that allows experiments in organization, time, and routing. Because of its abstract character the process of diagramming

delays typological fixation in design. As a result, architectural concepts are introduced and incorporated through diagramming, rather than superimposed to a design. Diagrams document two aspects of an integral process of design thinking: first, an exploration of how concepts, whether directly, analogically, or metaphorically transferred from text to shape, may relate to produce a more complex idea; second, how formal properties co-vary and how emergent design proposal engages and activates a field of formal possibility (Peponis 2002).

A diagram is intentional. It can be both analytical and expressive. Analytical diagrams, which are usually composed of definite shapes, denote logic relationships among elements. Expressive diagrams, which are usually composed of loosely defined shades, exemplify unspeakable emotions arising from the entities. Both analytical and expressive diagrams, because of their visual nature, embed initial forms of a design. Further, diagramming happens almost throughout a design process. At the beginning of a design process, diagrams are used to organize gathered information. In the design phase, diagrams facilitate the giving of form to formless information. At the end of a design process, diagrams serve as statements of design intentions.

A diagram is operational. It mediates the process of design thinking. Not only is a diagram a description of potential relationships among elements and a map of possible worlds (Stan Allen, 1999), but also, more importantly, it suggests and embeds operations that may lead to realizing the possible worlds. It is not fixed but evolving. It is not a final work but a process. An architect has to construct diagrams and think through them.

A diagram is medium specific. How a diagram is constructed and how meanings are embedded in it is determined by the medium of a diagram. Further, how a user interacts with a diagram is determined by the medium too. Since the ways of interaction trigger the transformative processes of design, the medium, in which the diagram is created, essentially is one of the determining factors of design results.

A diagram is not a final design work but it may stand on its own as an artifact. Although a diagram is a process it is also a product. This is why an architect's sketch on a piece of napkin can be framed and hung on the wall. The condition is that the making of the diagram possesses an independent value other than its contribution to a design project. Therefore, besides being a design thinking tool a diagram can be a piece of artwork.

Visual Thinking and Embodied Thinking

The process of diagramming is not only visual thinking but also, more importantly, embodied thinking. In his book, *Visual Thinking*, Rudolf Arnheim examines diagrammatic scribbles and how they aid thinking. He observes that these scribbles are highly gestural and hence highly abstract. They single out one feature relevant to the discourse and leave to the context the task of identifying the referent (1969). In Arnheim's experiments, the subjects are asked to draw certain concepts, for example, Past, Present, and Future. Arnheim then investigates the actual graphic qualities, such as characters of shapes, continuity and interruption of shapes, and growth of shapes. He concludes that the drawings, although intended to give an accurate visual account of a concept, are beyond the visual enumeration of the forces constituting the patterns. They demonstrate potentials for artistic expression.

Visual thinking is critical in architecture studios. As we know, architectural space has both functional meaning and symbolic meaning. A building is both a shelter that protects or a container that functions, and a place that has significance, meaning, reference, and symbolism. Architecture gains through exemplification and expression, rather than denotation, by way of commonly exemplified qualities and commonly expressed concepts and feelings. Architectural meanings are discursive, which determines that its design thinking processes need to be mediated by a discursive system such as a visual medium.

Arnheim's study has significantly influenced architecture education. Exercises of visual perception are a repertoire among many studios in American schools of architecture. The focus of the proposed project, however, is not merely about visual perception, but how to take a step beyond visually perceiving concepts to spatially creating designs. Therefore, the proposed project leads the visual to the multi-sensual and the spatial.

More importantly, design thinking is embodied because the mind is embodied. Abstract thought develops from embodied experience through metaphor. George Lakoff and Mark Johnson explain how spatial quality leads to spatial meaning (Lakoff and Johnson, 1999). Asserting that the construction of metaphor is rooted in spatial experience, Lakoff and Johnson state that "metaphor is not merely a linguistic expression (a form of words) used for artistic or rhetorical purposes; instead, it is a process of human understanding by which we achieve meaningful experience that we can make sense of. A metaphor, in this 'experiential' sense, is a process by which we understand and structure one domain of experience in terms of another domain of a different kind" (Lakoff and Johnson 1987, 15). Therefore, tactile qualities, such as the texture of strokes, the speed of a charcoal tip's movement, the pressure applied on the paper, become critical in embodied thinking.

Conclusion

Departing from the continuous process of a foundation year semester, this paper turns into a theoretical clarification of the functions of drawing as diagrams. What needs to be highlighted is the intentionality of drawing and its implications to design intentions. Such intentionality does not have to be completely under control because intuition is encouraged in design processes. Intentions also evolve from various reading contexts. It is, however, only when the intentionality becomes conscious, either before, within, or after the drawing process, that a drawing can become a design thinking tool.

What equally needs to be highlighted is that although drawing is a visual medium it is not merely a visual act. Therefore, more attributes than the visual, in particular the tactile, can form both drawing intentions and design intentions. In this way, the sense of touch complements the sense of seeing. If in architecture we are trying not to be diverted by only the visual should we not do the same in drawings, especially design drawings?

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