

TRACKING TACIT KNOWLEDGE:
A TOOLKIT FOR ARCHITECTURE PEDAGOGY AND PRACTICE

By

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To Emile

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Architectural education informs practice in an epistemic reciprocity between fabricating and the fabricated. Signification of these praxes is disseminated across conceptual, empirical and simulated fields. Michael Polanyi's treatise on Tacit Knowledge sought to rejoin logic and psychology thereby recovering insight and discovery in stages of problem-finding so as to validate a theory of knowledge, as scientific method, having ontological implications. This thesis is aimed at investigating how and where tacit knowledge inhabits the field of architectural praxis. It identifies tools that admit sentient knowing into the constructive domain and offers methodology for crafting intuition.

CHAPTER 1 TACIT KNOWLEDGE

Introduction

Tacit knowledge includes knowledge acquisition and experiences as acts of consciousness. These acts of consciousness become comprehensive entities through a spatial operation of the body and mind. Their interrelation internalizes the particulars of awareness and externalizes their joint focus. These acts are realized through integration. The body assimilates experiences that manifest as skill, skill in doing, skill in thinking. Understanding materializes through interrogative, speculative and intuitive processes of inquiry.

Peter Northouse distinguishes between general cognitive ability as biological and crystallized cognitive ability as learned over time. General cognitive ability includes perceptual and information processing, reasoning skills, creative and thinking capacities and memory skills. Crystallized cognitive ability grows continuously, increasing capacity in the life cycle of a human. Skills include problem solving, conceptual ability and social judgment. Cumulative experiences expand knowing. Knowledge is acquisition of “the ideas and mental abilities people learn through experience.”¹ In other words knowledge is competence in action. General cognitive ability directly affects crystallized cognitive ability with complexities of generative structures or strategies that yield understanding, problem solving and creative invention.

Both realms of cognition defined by Northouse, expand tacit knowledge potentially as a system of external and internal (social and individual) attitudes or acquired skill affecting things we are applying it to. Terms like common knowledge or common sense relate to general cognition. Common sense opens generative structures to permutations that are not explicitly

¹ Peter G. Northouse, *Leadership, theory and practice* (Thousand Oaks, California :Sage Publications, 2007), pp. 48–50.

manifested as behavioral performances. These nodes of consciousness are not always on the surface of immediate apprehension, as described by Michael Polanyi “*we can know more than we can tell*”.²

On that premise, this paper is situated in personal experiences and observations from educational and architectural practice. It is positioned as an interrogative inquiry of tacit knowledge in architectural perception, conception and materialization. The case studies are vehicles for reflecting on the functional relation of tacit knowledge, understanding tools particular to the craft of architecture and skills that manifest our body’s assimilation of experiences and the things around us. The first chapter will establish the conceptual and theoretical framework of tacit knowledge and act as an index for clarifying linguistic references within the chapters that follow.

What is the Relationship between Consciousness and Cognition?

what we lack most of all is a kind of general insight into the essence of consciousness ... and more especially into the essence of consciousness insofar as in and through its essential being, the natural-fact world becomes known.³

Edmund Husserl in his work on Phenomenology explored consciousness in depth, in an effort to expose the empirical (scientific) method of knowledge as being arbitrary. He suggests the empirical method assumes a wandering by virtue of a stationary point. The stationary point is an objective pole with precise objective laws, whereby each domain of science oscillates as independent and singular objective poles. He argued that the natural attitude is perhaps not a concept or fixed principle (as in origin $xyz=0.0$) but more a field of primordial-intuitive phenomenology. His philosophical method proposed a Reduction. Reduction is a process,

² Michael Polanyi, *The tacit dimension* (Garden City, New York: Doubleday & Company, Inc., 1966), p. 4.

³ Joseph J. Kockelmans, *Edmund Husserl’s phenomenology* (West Lafayette, Indiana: Purdue University Press, 1923. Republished by Purdue University Research Foundation, 1994), p.126.

whereby something that is not yet evident becomes so. Engaging “*Epoche* ... derived from *epechein*;.. meaning (a temporary) cessation”⁴ correlates with a suspension in judgment.

His Reduction entailed no pre-conceived (scientific) method; an eidetic transcendental ideal, embracing fact to essential form or *edios*-essences. This is the notion that beginnings have two forms, earthly (material) and spiritual (the transcendence of material). The reduction is a “transition” from what is about “meaning” to what is about “things”... the condition of its possibility⁵. This essence, the spiritual transcendental subject I, is I not as the individual but the *immediacy* of a given phenomenon. In this reduction the I spiritual, no longer manifests itself as a real being in a real world but only as the centre of intentional activities that co-relate to intentional objects. In Husserl’s words “ideating abstraction... the method of free variation.”⁶

His methodology explores consciousness as intentional and constitution as static and dynamic, whereby the static finds real components in lived experience, distinguishing from their intentionality. The dynamic of consciousness inversely describes the genesis or evolution of intentionality. The reciprocity appears hermetic until it is considered in relation to the methodological principle “every I think (*cogito*) is an I think what is thought (*cogito cogitatum*) each description includes the intentional object and the modes of *cogito* that are related to this object” (*Ideas, I:199-216[167-83]*).⁷ Any position of perception as a manifested act, referentially and at the same time, in reciprocity constitutes the object of perception as the same thing: noematic system.

⁴ Ibid.,p.118.

⁵ Ibid.,p.120.

⁶ Ibid.,p.119.

⁷ Ibid.,p.18.

Husserl's Phenomenology explores the constitution of objects in consciousness, its limits, through objects and aggregates and within an analytical framework of Reduction. This eidetic reduction is suggestive of the ways in which tacit knowledge moves between material and spiritual manifestations, as levels of essences: emerging cessations. The distinctive nature of all experiences and mental processes is what Husserl refers to as intentionality. Intentionality is a notion that the unique characteristic of every day experiences is consciousness of something. Intentionality may also include experiences that are measured in relation to the pure ego. The pure ego being a center of reference for passing thought. The dispositional nature of many positions of perception may reveal a contingent of tacit knowledge. Not explicitly relating to one act of perception tacit knowledge includes a cognitive consciousness and the immediacy of phenomena.

The Structure of Tacit Knowledge.

Michael Polanyi's tacit method builds on Husserlian thought. In his paper on *The Structure of Consciousness* he qualifies the *functional structure* of tacit knowing as a materialized integration of the particulars of a comprehensive entity. One important aspect of Polanyi's work is the reoccurring articulation of hierarchy and differing from Husserl's Reduction, a conceptual expansion of denotation through the relation of the body to mind.

Functional Structure

Along these denotative lines, the hierarchical structure is a parts to whole relationship, parts as having a subsidiary function in the comprehension of the whole. The whole, being the higher principle(s) that relies on the action of laws that regulate or govern the lower levels. However, it is not possible to "represent the organizing principles of a higher level by the laws

governing its isolated particulars”⁸. An example of this hierarchy would be how phonetic structures constitute phonemes in words but syntax, the structuring of words into meaningful sentences, is not accounted for by phonetic laws. Not all languages are so linear in their structural reciprocity, yet although this structure is stratified, the interrelation of the parts to whole is dynamic in its becoming. Polanyi states,

We attend *from* the subsidiary particulars *to* their joint focus. Acts of consciousness are then not only conscious of something, but also conscious from certain things which include our body.

the way we know a comprehensive entity by relying on our awareness of its parts is the way we are aware of our body for attending to an external event... by interiorizing its parts...making ourselves dwell in them,⁹ and the opposite to externalize them... apprehended by our dwelling in the boundary conditions of a lower principle on which a higher principle operates.¹⁰

The body is the receptor and instrument of receiving or attending the things around us.

Polanyi notes that the utterances of people are ultimately based on demonstrations of tacit experiences. In our incapacity to experience the same neural processes of another person we achieve gradual variations of indwelling. This means the experiences we attain through the body, our physiological knowledge of things, is at once unique and universal based on the independent nuances of each person.

The two leveled entity interrelates. The higher principles are enveloping and will “endow stability and power” relative to the subsidiary lower aggregates which are controlled

⁸ Michael Polanyi, *The tacit dimension* (Garden City, New York: Doubleday & Company, Inc., 1966), p.36.

⁹ Michael Polanyi, “The Structure of Consciousness,” in Marjorie Grene, ed., *Knowing and being* (Chicago, Illinois: University of Chicago Press, 1969), p. 214.

¹⁰ *Ibid.*,p. 218.

independently as “isolated parts.” This endowment of stability, he calls the semantic aspect. The shape and motion of this interrelation he calls the phenomenal aspect.¹¹

Functional Relation

In *Tacit Dimension*, Polanyi clarifies the functional, phenomenal and semantic aspects of Tacit Knowing. The structure is relational. Less about the composite nature of aggregates to a whole, structure becomes a conversation about measured proximity of perception and space.

The *functional relation* is the knowing of a first term (proximal) only by our awareness of it attending to the second term (distal), for example heat known from the bodily awareness of 96 degrees in the shade.

We are aware of the proximal term of an act of tacit knowing in appearance of its distal term; we are aware of that *from* which we are attending *to* another thing, the *appearance* of that thing.... the phenomenal structure of tacit knowing.¹²

The appearance of heat may be the rapid movement of a ceiling fan. The dimensioning or measuring of proximal and distal is an oscillation. Implicit is the notion of measure. Negative space or figure ground interrelations yield a similar analysis visually, where the appearance of a thing; such as an object or city plan can be measured through reciprocity of its figure ground reading. For Christian Norberg-Schulz, topology measures dwelling. The settlement of people in the identification of place is a proximal term, by its attending to the distal term, orientation or an existential gathering on earth. The measuring of proximal and distal terms operates at varied scales. Norberg-Schulz measures dwelling at the scale of human settlement whereas Polanyi measures indwelling at the scale of our hands. “We are attending to the meaning of its impact on our hands in terms of the effect on the things to which we are applying it”.¹³ The reciprocity of

¹¹ Ibid.,p.218.

¹² Michael Polanyi, *The tacit dimension* (Garden City,New York: Doubleday & Company, Inc., 1966), p.11.

¹³ Ibid., p.13.

our hands creating as well as receiving tacit knowledge conveys the ontological aspect “that we comprehend the entity by relying on our awareness of its particulars for attending to their joint meaning”¹⁴

Polanyi further defines the semantic aspect as a combining of the functional relation of tacit knowing and the phenomenal. In signification, the extension and intermediary role of our hands by the means of a tool or a probe “displaces” meaning. In medical science this tool maybe a scalpel, for architecture design education, a section cut, a plumb line, a pencil, or a personal computer. Through tools, meaningless feelings can become meaningful in that they are sentient extensions of the body. In this way a work of architecture as a vessel can operate as a tool, through our experience of it, knowledge of (in) habitation is figured and at times pre-figured as archetype.

The Role of Intuition in Tacit Knowledge

INTUITION: A quick ready insight. The power or faculty of attaining to direct knowledge or cognition without rational thought.¹⁵

Definitions of intuition waive its immediacy and a presumption that intuition is irrational. Herein lies its problematic. This vague and mysterious assignment characterizes intuitive knowledge as, in part, an inability to fix the multitude of sensory experiences that established the intuitive ground. The intuitive grain or comprehension of our perceptual experiences is anchored in tacit knowledge.

Michael Polanyi tackles the problem by developing an idea about generative rules within subsidiary awareness. In *Sense-Giving and Sense-Reading*, the nomination of sense-reading as tacit experience and sense-giving as tacit knowledge integrates experience with a conceptual

¹⁴ Ibid., p.19.

¹⁵ *Merriam Webster new collegiate dictionary, seventh edition.*(Springfield, Massachusetts: G&C Merriam Company, 1972)

“subsumption” of the experience becoming an intellectual reading or explanation. This process creates meaning. In its inverse relation, sense deprivation is a loss of bodily character of the external thing being attended to. Language acquisition in this process can be lengthy, “a strenuous search loosens possible bits of a solution and that discovery is achieved by an effortless integration of these bits.”¹⁶ Polanyi calls this process intuition. He also states that intuition is a skill. The dynamics of knowing with intuition reduce the explication of rules of memorization to inference by which memory can inform tacit knowing.

An important contribution of Maurice Merleau-Ponty to tacit knowing is not only the location of the body as central to its thesis but the role of the senses in perception as a formidable integrator of the proximal and distal structure of tacit knowing. The senses organize our experiences seamlessly in the lived and objective space of the things in the world around us, so seamless that the knowledge becomes invisible. By structuring and constituting the visible world in a way that it is our “Reflection” that “slackens the intentional threads which attach us to the world and thus brings them to our notice; it alone is consciousness of the world because it reveals the world as strange and paradoxical.”¹⁷ Merleau-Ponty’s work on perception and the body reinforces Husserl’s position in the relationship between perception and avenues of thought in the capacity to understand the things around us. He maintained that our embodiment admits perceptual experiences and presents itself to us in consciousness.¹⁸ This consciousness is our experience, at once with us and independent of us.

¹⁶ Michael Polanyi, “Sense-Giving and Sense-Reading,” in Marjorie Grene, ed., *Knowing and being* (Chicago, Illinois: University of Chicago Press, 1969), p. 201.

¹⁷ Maurice Merleau-Ponty, *The world of perception* (London, UK: Routledge Classics, 2008), p.11.

¹⁸ *Ibid.*, p.11

Richard Sennett uncovers the appearance of intuition within the act of arousal. He notes that intuition begins with a sense of possibility. In craftsmanship this sense is signaled by the frustration of the limitations of a tool. The tool organizes the possibilities by the means of an intuitive leap. He identifies a procedure of reformatting, adjacency, surprise and gravity for how intuitive leaps happen¹⁹. In reformatting, a fit-for-purpose mold is broken. This allows new possibilities for the imagination to intervene and repair. In adjacency, two unlike domains are paired, they stimulate each other towards the dynamic invention of a new tool. The intuitive leap happens across the adjacent domains, dredging tacit knowledge in its movement. An unexpected surprise occurs and this initiates wonder at the discovery of an unforeseen potential. The fourth stage is gravity. Gravity comes with the understanding of what leaps cannot defy. The reckoning of gravity is the unresolved problems that remain, in the transfer of skills, in technology transfer. Sennett's suggestions are not listed as protocol but can be recursive or non-linear in an operation of logic. This procedure aids Polanyi's process of language acquisition.

Intuition in tacit knowledge may register as an illuminated point. This is the immediacy of comprehension. Intuition in tacit knowledge may also be a transitive operation of discovery, unraveling, loosening or aligning the grain of experiences. The grain of our body's sentient understanding.

In summary, the creation of meaning is a tacit contract²⁰ endowed by perception. As extensions of our body tools objectify, mediating between fields of proximal and distal "terms." Skill expands the capacity to move between these fields, increasing the scope of knowledge.

¹⁹ Richard Sennett, *The craftsman* (New Haven, Connecticut: Yale University Press, 2008), p.212.

²⁰ Michel Serres, *The natural contract*, Elizabeth Mac Arthur & William Paulson, trans. (Ann Arbor, Michigan: University Press of Michigan, 1998.), p.21. Serres discusses the tacit contract as a consensual or contrary agreement which is endlessly traversed by polemics and debates. It is the site of war or peace; the production of knowledge between a growing body of researchers checking on one another.

Tacit knowledge hinges on practice, on habitually becoming skillful, this hinge elicits ambiguity.

Intuition occupies ambiguity in a state of flux and is identified as:

- Language acquisition: In tacit knowing language acquisition is that lengthy process of searching that loosens that *knot*²¹ of the subsidiary particulars integrated with the whole.
- Insight: *Sense-giving* and *sense-reading* unravels as a generative operation between experience and the experience becoming an intellectual reading. Explanation in the manner of reproduction, the “restating” of the problem is also considered a form of insight.
- Reflection: slackens the intentional threads, this is the passage through the third place²²
- Skill: is an imbedded knowledge, the recurrence of trial and error. For Polanyi it is “rooted in our natural sensibilities to hidden patterns and developed to effectiveness by a process of learning.”²³

These conditions as verbs, as acts of cognition, become crystallized to achieve gradual levels of indwelling. In the knowledge of architecture they iterate and concretize exercises measuring the proximal and distal phenomenal aspects of in-habitation. The semantic aspect achieved through signification of tool in relation to medium.

To expand Polanyi’s argument, this study is posited where ambiguity resides, in the notion of ‘the logical relation of subsidiary to focal’ (that is in nominating a hierarchical construct as an analogy of four aspects; function, phenomena, semantic, ontological of the integrative act). The functional structure of tacit knowing elicits ambiguity in the signification of a higher principle

²¹ Michel Serres, *The troubadour of knowledge* (Ann Arbor, Michigan: The University of Michigan Press, 2000), p.20. The knot is an illusory condition. A complex of certainty and uncertainty that is woven or folded from numerical progression into a topological space.

²² Ibid.,p.45. The third place Serres assigns as in-between, the middle of all others that imposes on intuition. “In knowledge and instruction a third place also exists, a worthless position today between two others: on the one hand, the hard sciences, formal, objective, powerful; on the other, what one calls culture, dying.”

²³ Michael Polanyi, “The Unaccountable Element in Science,” in Marjorie Grene, ed., *Knowing and being* (Chicago, Illinois: University of Chicago Press, 1969), p.118.

that is necessarily conceptual. However, this logical structure is contingent on the non-conceptual; the body.

My position is that Intuition as language acquisition is relationally driven. Intuition together with a competence that necessitates agility in utilizing a probe, prod or tool, signifies this body as construct. In other words, the physical product, architectural proposal, as real as it is to touch, is a scaled re-presentation or simulation of actuality. The non-conceptual and conceptual bind the integrative act as a concrete thing. These constructs are core components in the continuity of the education of architects. Works of architecture occupied at human scale inform educational praxis, most commonly as case studies. Both realms of fabrication relate not only to school culture but also to approximations of validating scholastic aims.

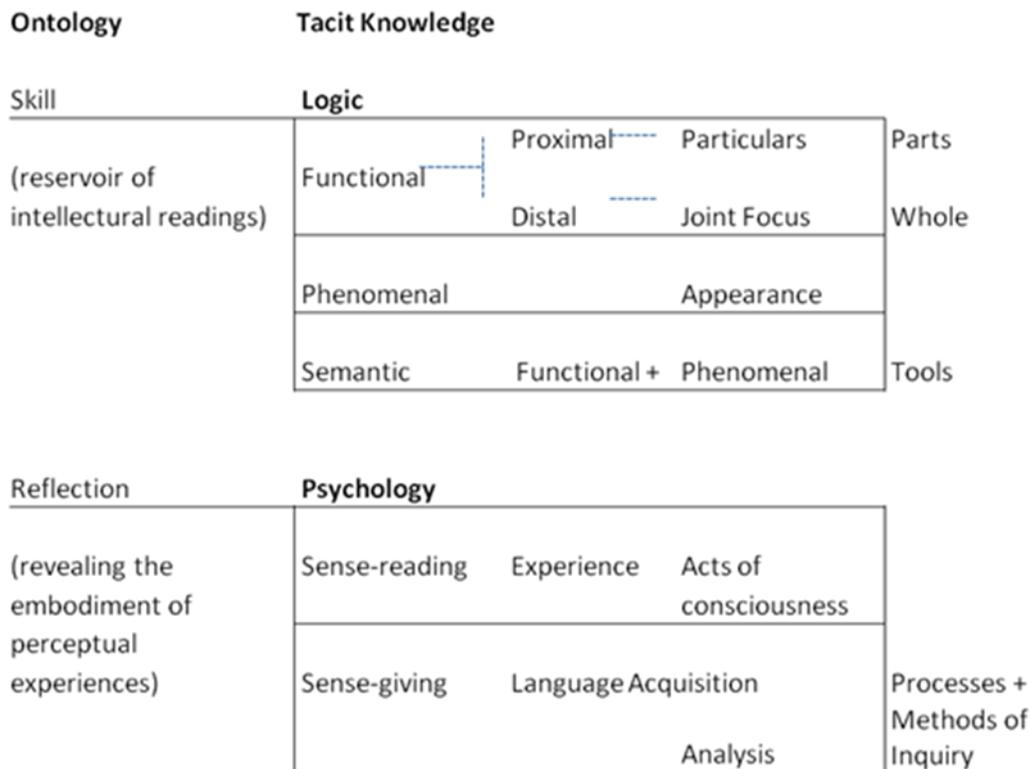


Figure 1-1. Tacit knowledge system

Caveat: Skill of Educator vs. Skill of Student

In the formulation, discovery and skill agility of probes, the educators aim is exploration. As jurors, the experienced seeing negotiators, educators are seasoned at *sense-reading* and *sense-giving*; developing visual and motor muscle memory in perception and creation.

This is a practiced skill, provoking inversions or ambulatory stations and processes of inquiry, including learn by doing , through explanation as a form of insight, reflection, listening and adjusting curricula levels in order to instill learning for the weakest link of the chain. Habitually becoming skillful.

In acquiring the skill of sense-giving there is doubt, error, failure and recovery. A margin of tolerance and friction is necessary in the learning of a skill. It is an evaluative mechanism.

The location of the student's skill is in language acquisition and dexterity of performance. The agility of operation is through the sentient attribution of a prod, arm, prosthesis and instrument. This includes the skill in using designated tools for drawing with various instruments for example, pens, pencils, ink, stones, scaled ruler, mouse, software and camera. Also, agility includes the skill of constructing within the physical limitations of materiality for example building with bamboo, timber, mortar, steel, glass and light. What is the knowledge of sticky back?

How these constructs reside as scaled particulars, as efficient constructions against gravity's pull together with the mind-body perceptual approximations of differing media and theoretical proximities (plaster to software), is that point of illumination of intuition. Where these constructs reside is in inquiry, the objectives of curricula. In the domain of tacit knowledge they are imbedded in the unraveling.

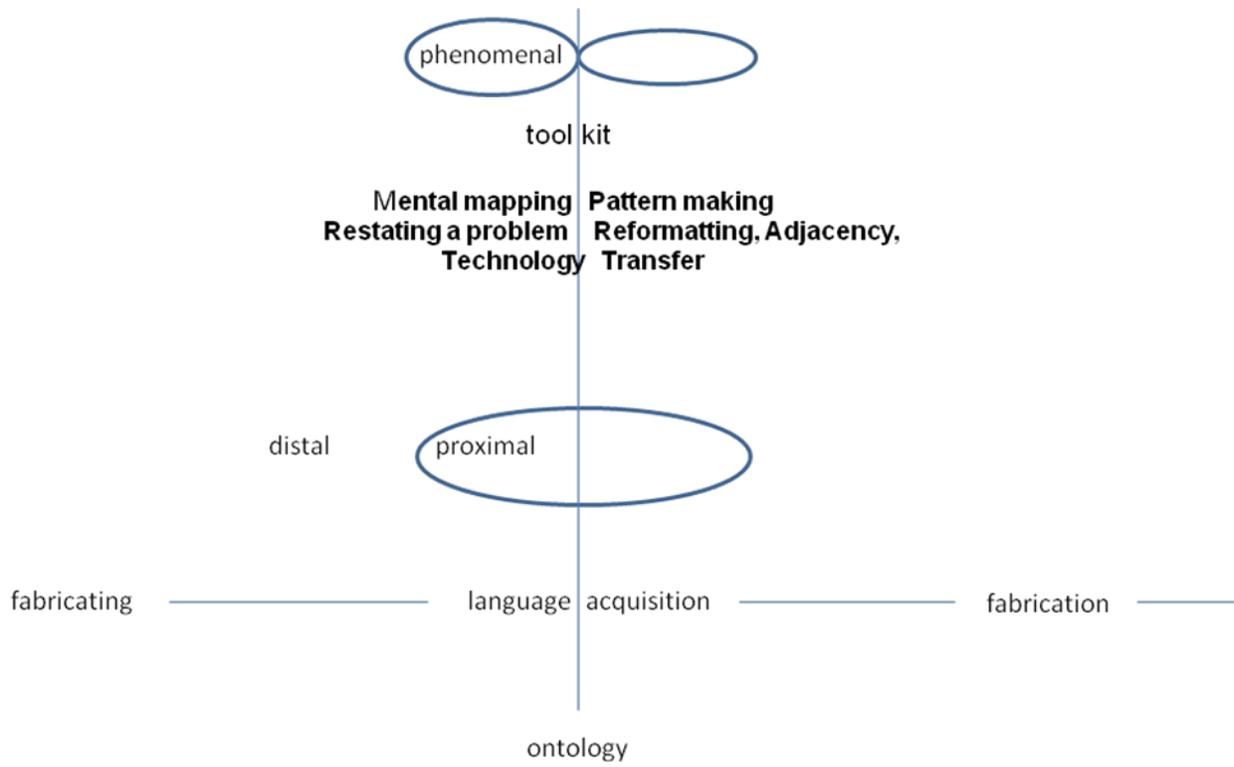


Figure 1-2. Knowledge diagram 01

CHAPTER 2 THE BODY: READING THE CITY

Identifying the Body

The body has been a continuous subject of discourse in architecture history and theory. Leon Battista Alberti's Renaissance treatises on lineaments and structure separated the structural body from its surface reading of ornamentation, akin to the mannerism of facial expression. Andrea Palladio's corollary of harmonic proportions created a classical ideal for human proportion and geometry and Le Corbusier's Modulor deposited a similar idealization of the human body, coalescing ratios with patterns in nature for example the golden section. In contemporary thought Diana Agrest's subversion of these classical tenets recovers rhetorically the body of the creator (architect) as feminine. The body as symbol occupies a condition of otherness. The otherness is a boundary production of inter-textual spatiality.

The role of the human body in practice is predominantly an ergonomic device that generates occupation codes, circulation patterns, standards and guidelines for furnishing fittings and the building structure. The *New Metric Handbook*, *Architectural Graphic Standards* and *Time Savers* are a few ubiquitous field references. By products of the machine age, these instruments interpret measurements of a human body and create symbols of a perceived standard body. The human body's temperature and environmental comfort is a determinant in the practice of creating habitable built structures. Comfort values are dependent on global location. What becomes symbolic in designing for environmental comfort is the building's enclosure, a third skin. This third skin modifies or, in some cases, conditions our body's sentient experience.

The human body is receiver and transmitter of knowledge. The tools that we create in order to understand any particular medium, are extensions of our receptors; our eyes, hands, feet, and skin. The tools we create inform how awareness is communicated. Such tools transcend

knowing. They are devices of ideating abstraction. How effective the tool becomes in its application, its use, is made apparent through social consensus. Whether the body becomes a generative proportional system, probes spatiality or is realized as a metaphorical object, any of these displacements configure points of perception and making.

Context: Language Acquisition of Urban Space

If we are to consider sense-reading to be experience and mental mapping and sense-giving to be visual representation and intervention in urban space, what would the tools for that media be?

From experience, The Caribbean School of Architecture (CSA) conducts an urban study program by way of regional travel called Study Tours. Visits are typically two weeks and span the language and cultural diversity of the Creole melting pot. These studies are not off the book programs but instead they are integrated into the core curriculum directly related to particular levels of architectural studio performance.

There are three distinct fields that frame the discourse on the spheres of urbanism and architecture. (1) The climatic which extends laterally across the equator encompassing the domain of an architectural regionalism. (2) The Diaspora which relates to the migration of Caribbean people primarily in a south/north dimension and (3) The new Caribbean Regionalism which includes Latin and Central America as well as the islands of the Caribbean. This third field relates implicitly to the diversity of Caribbean culture that is bound by global economic and consequents merging governmental policies¹

The climatic is an equatorial condition of centuries of built responses to tropical storms, cyclones and hurricanes. The formal adaptations of buildings for hot, dry or humid conditions are

¹ Norman Girvan. (2002) Globalization and Caribbean Cooperation. *Association of Caribbean States*. Retrieved, 2003, from <http://www.acs-aec.org/sg.htm>.

parameters included in this field. Bruno Stagno nominates tropical architectural production as a cultural condition of the climatic zone. Recalling the relevance of regional literature as a source of enriched thinking outside of Cartesian thought, Stagno promotes the condition of *Tropicality* as being overcome by sensuality of the climatic zone: I am here therefore I am. Further he suggests Tropical thought is diverse because in its occurrence across the tropical belt many cultures exist “in contradistinction to the sameness of responses.”²

The Diaspora is an anthropological history tied to economics evidenced by movement. Indigenous Indian people were predominantly extinguished by European colonialists, although few communities survive (Dominica WI). With the growth of plantocracy, island territories were populated with enslaved African people. The history of enslavement is more entrenched in some islands than others, as evidenced in differences between Trinidad and Tobago and Jamaica. Migration of Asian people began during the period of Indentured laborers, and Middle Eastern merchants thereafter. This composite of cultures crystallized into what is known as the identity of Caribbean people. The continued history of the movement of Caribbean people is evidenced by West India Regiment and the Windrush (pre and post Independence) with settlement in cities beyond the island territories. So, to speak of the Caribbean city without including a Caribbean Diaspora would deny London, Toronto, New York, and many extra-territorial communities on a vertical north to south relation. This polyvalent space is the diasporic condition anchored in island territories with global satellites.

The new Caribbean Regionalism had its conceptual birth at the ideological time of the Federation of the West Indies. Now, in a neoliberal global structure, the Greater Caribbean leadership roles are dependent on non-governmental organization and the private sector. This

²Bruno Stagno, “Tropicality,” in Tzonis, Lefaivre, Stagno *Tropical architecture: critical regionalism in the age of globalization* (Chichester, West Sussex, England: Wiley–Academy, 2007), pp.78.

reduction of state dependence may forge new economic relations between Caribbean Community (CARICOM), Central and Latin America, so as to increase the regions ability to compete in a free global market. Communication with territories beyond the traditional north to south relations anticipates expansion of cultural and language cognition.

The dynamic of Caribbean cities, is their size in relation to the cultural diversity, as well as morphology in dialogue with geographical land features. Examples of this are evident in the urban space of Roseau and Castries. The French quarters of Roseau activate the formality of British planning. This kind of disjuncture is also evident in its materiality: cast iron versus masonry or the kind of joinery in timber construction. Distinctions in treatment of the building envelope, the varied roof types and profiles are as much cultural products as they are resultants of rainfall and wind forces. Verandah typologies, as well as variations in the treatment of thresholds between street and building entry, articulate cultural diversities between islands.

Within this civic relation of buildings to urban form is a creolized spatiality. Pidgin is the linguistic term for a provisional language that develops out of the need to communicate across different languages. As a bridge, Pidgin embodies adaptation. Pidgin can develop into a fully structured Creole language: syntactically, semantically, and phonologically. This quality of urban form typically grows and at times ruptures or nests, within terrain, landscape, geology. I see these forms as Husserlian cessations, an immediacy of phenomena which is often related to the economics of land tenure.

At the inception of the School, the objectives for the first year of travel study were outlined as Observe and Record. The theoretical positioning was not clearly delineated and therefore interpretation of syllabus was left to the lecturer (professor) conducting the study. The urban study parameters set in the first year would become foundational knowledge. These parameters

needed to be strategic in anticipation of the projected levels of complexity that would develop in the subsequent years, strategic with the Commonwealth Association of Architects (CAA) validating criteria. There are numerous ways the epistemological positioning of the study could be interpreted:

- Empirical: As an empirical study with criteria that cities within the Commonwealth, India, Africa, Australia, Canada would be an epistemological grounding; the logos of urbanity. Certainly, the visits of Charles Correa and Douglas Cardinal to CSA and participation in studio inquiry have advanced such a reading of the project.
- Deductive: As a descriptive analysis evidenced by the work of Bill Hillier in *The Social Logic of Space*. Hillier's critique of architectural discourse is that it relies on representation: words and images which cannot go beyond surface to complex relations of social constructions. The University College London Bartlett's research on the social logic of space borrowed from anthropology a notion of descriptive autonomy. A position which assumes spatial configurations of social and mental habitation is autonomous and unique. This accounts for variations and diversification in morphological type and space syntax. In order to understand variations of space systems in cultural dimension theoretical positions needed a descriptive basis.
- Inductive: the experience an individual faculty member offers in their interpretation of the syllabus, thereby writing curricula, pedagogy as an event as a verb.

Given the history of the establishment of the school, the urgency in documenting and knowing the cities/ towns in the Anglophone territories was a priority. The faculty of the CSA would provide a forum for discussion and analysis. There was no explicit nomination of the program as research. However, it was deemed essential scholarship or a logic of reasoning that connected practice and theory.

I was assigned the responsibility of leading urban studies for Old San Juan Puerto Rico, Castries St. Lucia, Roseau Dominica, St. George's Grenada, Georgetown Guyana, Santo Domingo Dominican Republic, Port of Spain Trinidad and Tobago, between the academic years of 1998 to 2006. Participating students were third and fourth year level of the pre-professional degree; Bachelor of Arts in Architectural Studies. The Architectural Institutes and its members in partnership with the CSA through the Association of Commonwealth Society of Architects in the

Caribbean (ACSAC) often delivered insightful lectures and seminars depositing a rich knowledge of experience through practice. Urban theory texts of Aldo Rossi, Kevin Lynch, Spiro Kostof, Norberg-Schulz, and Diana Agrest, for example, have also guided these.

The Spirit of Place

Let us now consider what Aldo Rossi meant by *locus* in the collective memory of citizenry. Aldo Rossi thinks about *locus* in two ways. The first is that *locus* acquires its full meaning in the urban context as the unity of a single artifact, its materials, and the events that unfolded around it. The artifact is the place that determines it and the mind that makes it. He also thinks of *locus* as the “characteristic principle of urban artifacts”.³ The synthesis of values, architecture, permanence and history helps to understand the urban artifact as event and form.

For the Anglophone Caribbean city, individual buildings, monuments, and the artifacts of longevity have been recorded by historians David Buisseret, Barry Higman and Edward Crain of the University of Florida. However, should we attempt to measure totality, there are physical gaps of continuity in memory. The topological is surface-etched, scored, torched, cracked, mended and wind-blown by virtue of location and social history. The collective memory or consciousness of the city may, as Rossi suggests be a rational operation demonstrated with maximum clarity, economy and harmony. But in a condition of flux and instability the body of architectural knowledge is not always anchored in type or a single artifact. Its space finds more affinity in bricolage or montage and juxtapositions.

For the Caribbean city we may need to consider locus as the synthesis of architecture and impermanence in relation to history, so as to expand event and form into urban elements-streets, quarters (districts), edge conditions. Polanyi’s functional relation is helpful in relating the

³ Aldo Rossi, *The architecture of the city* (Cambridge, Massachusetts: MIT Press, and New York, New York: Oppositions Books, 1982), p.130.

proximal term of urban analysis in relation to a distal term. Urban space can be brought into an understanding with the tools of topology, morphology and typology. These tools can qualify urban elements. If we also consider built form as a vessel, the props, prods and tools that negotiate perception can assist the collective memory through a notion of archetype. The archetype embodies human (in) habitation or dwelling. Dwelling manifests in singular and multiple configurations from object to urban form. Martin Heidegger in “Building Dwelling Thinking” analyzes iconic representation within human engagement of a four-fold: earth, sky, mortals and the divinities. The bridge, a human-made object, is an extension of our selves. Through this object we understand a relationship of the river and sky it spans, both banks. Crossing it or standing within it, occupying this bridge yields an understanding of dwelling on earth. Mortals are. We persist through spaces by virtue of our stay among things and locations. Archetypes have aspects of the symbolic and materialize in techne⁴.

Case Studies

1998 Kingston, Jamaica WI

Kingston is a fairly well-documented city; its social history can be read in parallel with evolution of the city. Natural disasters have fueled invention of this city in the recovery and resilience of citizenry over centuries. There may have been a number of reasons why the capital of Jamaica relocated to what we now know as Kingston. Certainly the earthquake of 1692 and the 1703 fire in Port Royal reinforced the need for a town to be situated with greater shelter and infrastructure. Resettlement was a priority. Emancipation in 1838 had a direct impact on the

⁴ Martin Heidegger, “Building Dwelling Thinking,” in Neil Leach, ed., *Rethinking architecture* (London, UK: Routledge, 1996), pp.99–108. Heidegger discusses techne: In Greek, “techne meant neither art nor handicraft but rather: to make something appear, seeing, becoming”. This presence for Gottfried Semper is the primordial unit, knot and joint its kernform (core form) and kuntsform (art form) as constituents of building. These elements are at once poetic (the idea) and tectonic (the fabric) of structure. Kenneth Frampton emulates a similar discourse; the tectonic object as a dichotomy between the carpenter and the poet. The tectonic act is an engagement with materiality, the exigency of economics and poetics.

plantocracy system which supported the governance of the country being based in Spanish Town. The Industrial Revolution made possible a Railway system that connected Spanish Town to Kingston and offered an ease of developing a new urban centre.

It is ambiguous as to whom the layout of Kingston is attributed. Minutes of the Council of Jamaica indicate it was John Goeff; however the Plan of Christian Lilly 1702 is the earliest piece of cartographic evidence available for speculation: "The town plan was to provide the physical basis for a resettlement scheme and accommodation for the commercial economy of the port." ⁵

Blocks were typically 320 ft. X 600 ft. divided by a central service alley, lot sizes 50ft. x 150ft. The central figure, Kingston Parade was bisected by King Street running north to south and Queen Street running east-west. These streets were 16 feet wider than typical, accommodating major traffic. The water front, Port Royal and Harbour Streets were the areas for commercial activity with warehouses and a few of public buildings (a playhouse and a courthouse with treasury and a post office). The Town Plan was centrally ordered, symmetrical, orthogonal and compact. After the 1907 earthquake, the Kingston Council mandated that all public buildings were to be removed from the water's edge and internalized on the north-south primary artery of King Street. Of significance was the general use of stone and cement instead of bricks as building material for public buildings. The civic presence of the square diminished as military functions relocated to Public lands northeast of the city, Up Park Camp. The Parade was converted into a public park: (Queen) Victoria Park. The gridiron on the Liguanea Plain was not ideal; health conditions, water collection and stagnation moved residential sectors north.

Historical artifacts of Kingston (downtown) make possible reading of the collective memory of the city. Social history, after Independence has dismantled the urban fabric of its

⁵ Colin G. Clarke, *Kingston Jamaica, Urban growth and social change 1692-1962* (Berkeley, California: University of California Press, 1975), pp.50-60

core. The reformatting of locus of the Caribbean city can be the situated here. Interventions of a civic nature are typically sited along the harbor's edge. The urban studies that are conducted in Kingston are sociologically concerned with housing and making space livable. Survey instruments are tacit tools in the understanding of how people live privately and commune publicly. Surveys can assist students in bridging the domain of academia within field work. If the social complexities of the site do not allow administering surveys then the content equips students with a phatic framework.

2000 St. George's, Grenada WI

I was once asked during the Puerto Rico study (1999), if we had any pre-determined ideas of what the study tour was going to be. It was a wide open question that inferred other questions, for example, what would the outcome look like, a theoretical determinism or expectations of deliverables for evaluative purposes? It was a good question posed by a third year student from the Universidad de Puerto Rico at Rio Pedras. And for that first study the *Image of the City* in retrospect, proved too didactic. In Grenada, there were no pre-determined ideas or ideals. The study was about a discovery, a mental mapping of an if-then⁶ proposition.

Because most of these cities (with exception of San Juan Viejo and Santo Domingo) were in transition of archiving and identifying their Heritage list buildings, the first tasks were always to assess where the oral history resided, with whom and to what extent material evidence such as documents, photographs, drawings of the city plan or specific buildings, books and essays would substantiate the oral narratives. We would walk the length of the town to mark through our body (knowledge of distance) and correlate this with what documents we sourced, sometimes diagrams without scale.

⁶Richard Sennett, "Arousal How Intuitive Leaps Happen," in *The craftsman* (New Haven, Connecticut: Yale University Press, 2008), pp. 213.

The city plan was just beginning to be converted to a digital format. The city planning office offered the study of a preliminary plot, advising that the actual measurement of buildings were yet to be confirmed. Essentially, the scale and accuracy of the satellite image was in the process of becoming legitimate by virtue of the in-situ, actual, real city. The agenda of the study was not to conduct a measured survey. However, in utilizing this provisional drawing, this tool, we could navigate the city while addressing the proportion of the drawings physicality; an adjacency. This position became the thesis of that visit whereby the speculative artifact, in its imprecision allowed a reading of urban space between the on-the-ground condition and its representation. Our experience concretized a tacit knowing of the urban body. Through human procession (physical), analytical representations of experience concretized the perception of urban space. Some of these findings exploited the notion of boundary in urban form. They investigated the unfolding of boundary as a construction of urban elements, historical artifacts and topography. Others adjusted aberrations of the figure ground drawing in relation to a proportional measure of body.

The year following our visit, fire engulfed the historic quarter of St. George's. Listed buildings were lost; locus erased. The students' work of that quarter became an invaluable document for the Willie Redhead Foundation who had hosted our visit. The relevance of preparing complete visual reports of these studies and distributing them to host communities is not always carried out as a "built" criterion for Study Tour. However, the service that academia offers a community by doing so is a complete act of scholarship, a kinetic pollination of the knowledge base of academia.

2006 The Valley, Anguilla BVI.

By the fourth Study Tour, I discerned that it would be possible to integrate these investigations into a studio project, an intervention by allocating specific site and program. In

Polanyi's words sense-giving. The proposal was accepted by internal and external examiners and expanded the investigation as an interrogation of perception. The years following deliberated adjustments on the size of the brief and level of engagement the program offered. This curriculum adjustment is on-going. It is that conscious reckoning of technology transfer.⁷

The interventions that developed out of the town study 2006, in retrospect, had the right fit of student cognition level: scale of town, program or brief and building type. The Valley, Anguilla's town center is rural, there are two main arterial roads that intersect and constitute the town. The built fabric is low-lying and sparse. Delineation of plot and property lines is seldom. Timber buildings in the Valley are crafted with shipbuilder details although more resilient material entered the island in the 1940's adapting the archetype. More than two thirds of the island is private property accounting for an inability of the local governing entity to develop a town centre, streetscapes including sidewalks or establish zoning regulation. Building regulations introduced in 1990 are subject to personal scrutiny and implementation. The citizenry are unwilling to transfer ownership of private lands.

The program for intervention could not be decided until field notes were returned to CSA and we had an opportunity to discern the character of place and potential urban form, from imagery and diverse data. Unlike previous studies where the site and program for intervention were ear-marked before leaving the place of study, this distancing of experience encouraged reflection and insight in the restating of the project brief. The Valley is not urban. We had to program a series of sites with very legible urban elements: plaza (square), promenade and the spatial joint of an intersection. Understanding the public domain of urban form became the main

⁷ Ibid

objective. Studies of ancient cities supplemented studio critiques as well as charrettes on urban form. This provided an opportunity for History curriculum to be directly applied in studio.

The programs for the sites were conceived around the maritime history and the real need for a civic center. This center was scheduled with areas for a campus plaza that would adjoin the existing administrative offices of the municipal government. The absence of urban form in Anguilla limited the complexity of the on-the-ground study. As lecturers we had to construct a tacit tool kit in structuring particulars from the field notes to legible public urban elements—a more discursive reading of urban elements. The intervention tool yielded meaning in its representation. They offered points of conjecture for the Anguilla planning authorities when the project for a new Government plaza materialized in 2008. To confirm Polanyi's observations that "The less tangible the focus, the more purely mental is its object: from a meaning that consists in an object we pass to meaning consisting in a conception."⁸ For CSA, the more tangible the focus, the more physical is its object. The effectiveness of curricula as a tool crystallized through societal consensus, this is the act of scholarship when academic production directly affects the societal concerns in its place of anchor.

2008 Gainesville, Florida USA

The UF School of Architecture (UFSOA) is structured similarly to CSA in that the first four years are pre-professional, with the Graduate studies completing the professional degree in architecture. Design Studio 3 (D3) is the first semester of the second year of architectural studies. It is a qualifying year as an internal assessment for acceptance into the upper division is made at the end of the second year. The 2008 D3 syllabus outlined project 2 as a cultural construction: "Structure of the City+ Myth of the City=the Idea of the City". Faculty decided that the area of

⁸ Michael Polanyi, *Knowing and being*, Marjorie Grene, ed.(Chicago, Illinois: University of Chicago Press., 1969), p.190.

study need not be a place the students would visit. In the unit I taught, the decision to study Caribbean cities had two big hurdles: the availability of data and the ability of students to understand the cultural context sufficiently to intervene in project 3. Project 3 was written as the making of an intersection between program and the idea of place. A specific schedule of areas was not required as part of the D3 syllabus, thereby reducing creative constraints.

The CSA urban study documents of St George's for 2000 and 2008 and the study of Port of Spain Trinidad, 2007 were utilized as instructional material for teaching D3 at the University of Florida (UF). Together, the two cities offered a comparative analysis of Caribbean urban space. The UF Map Library was useful in that we could have a general discussion about the region and how certain maps are constructed, for example how to read between topographic and statistical information on rainfall. We could also have conversations about heat exchange of island territories and how trade winds and other environmental factors create micro-climates within specific communities. This kind of knowledge CSA students who visited these islands would feel through their bodies. The tactile quality of these over-sized maps was more immediate than the Google earth search. St George's was not clearly delineated in Google earth unlike other cities, for example Kingston, Jamaica. Planometrics from my personal library of Kingston and Port of Spain enabled instruction in the understanding of scale in city plans. For St. George's, this data was gleaned from the CSA document. Other references, audio visual and literary, included: the Banyan Production documentary of *Crossing Over* in the music library, relating the presence of West Africa in the music of the Caribbean, specifically Trinidad and Tobago. The works of Nobel Laureate Derek Walcott, and the collaborative project of Derek Walcott and American Romare Bearden and Milla Cozart Riggio's texts on Carnival were instrumental. These words and images as components of tacit knowledge, were endowed with

experience of tone, color, texture, atmosphere of place. YouTube was a useful source in that it offered multiple visual perceptions or appearances of what could constitute phenomena: shape and motion.

The distance of place insisted on reconstructing a tool kit that could embody the identity of place. By utilizing a territory that is provisional in normative discourse without pre-conceived images as published work or part of a school culture, the rhetorical aspect of studio critique can be waived. For example, students and educators alike become accustomed to their school culture. The expectations of image production and the language of making which are deposited from previous years, sets the benchmark of quality for upcoming students. It also engrains school culture. By introducing different ways of seeing and thinking about the same discipline, preconceived images of what a project should look like are infused with dialogue, which offsets rhetorical production. The more distanced the field of recognition the more enriched the probes become.

The fabrication of a whole (intervention) from intangible parts (the virtual body) required the tooling of an interpretative mechanism. The mechanism located the intellectual reading of Polanyi's sense-giving in the domain of exploring architectural elements: floor, wall, roof, membrane, armature, materiality. The intervention became a re-codification of techne in relation to its virtual context. The students worked in self-assigned groups. The relevance of group work is a mechanism of Constructivist learning. The combinative aspect of knowing Caribbean shape, motion and society was further probed programmatically as event space. Within an intuitive process of tacit knowing the surprise was the ability of students to grasp place without having been there.

The structuring of syllabi in the case studies above is flexible in different ways. The CSA examples leave the distal term (urban space) open-ended whereas the UF School of Architecture examples build abstraction in the proximal term (intersection of program and place). The former suspends methodology, whereas the latter scripts a method. The difference may be a factor of variation in the level of student, third year (semester 2) versus second year (semester 1), or the proximities to the tangible aspects of perception and conception. The inverse positions of experience in the examples of CSA and UF students studying Caribbean cities are the differences between tangible and intangible foci. Both stations of tacit knowledge, the tangible and intangible induce memory. The CSA examples do so with tools formalized discursively or discovered in reading enunciatively. The UF School of Architecture example, with an invented cultural tool kit grounded in abstraction.

Within these case studies, a notion of archetype is also constructed between tangible and intangible foci. The actual place persists within and without simulated constructs of the represented and imagined place. Representation is the shell of imagination and imagination suspends its representational gravity. What remains is atmospheric. This gravity is the systemic order of topology, morphology and typology. Representation denotes the simulated dwelling space of the archetype. The position in-between fabrication and the fabricated is of otherness; an enigma.

This position suspends the body as a known artifact. In becoming place, an indwelling occurs between the phenomenal and function aspects of tacit logic. The suspended body moves between the parts to whole dialectic occupying the intangible unknown space of conjecture. Memory of the actual place becomes a montage field that resists, articulates and yields impressions of type or the single artifact.

The fluid and intangible nature of the memory field is inhabited by wonder and illumination that expands its conceptual potential. In so doing the field may become an autonomous context, text or wrapped about other axioms and new points of departure.

In probing further the enigmatic body, this paper will investigate ways of crafting the intangible, through a discussion of media and medium as well as the role simulation plays in architecture pedagogy.

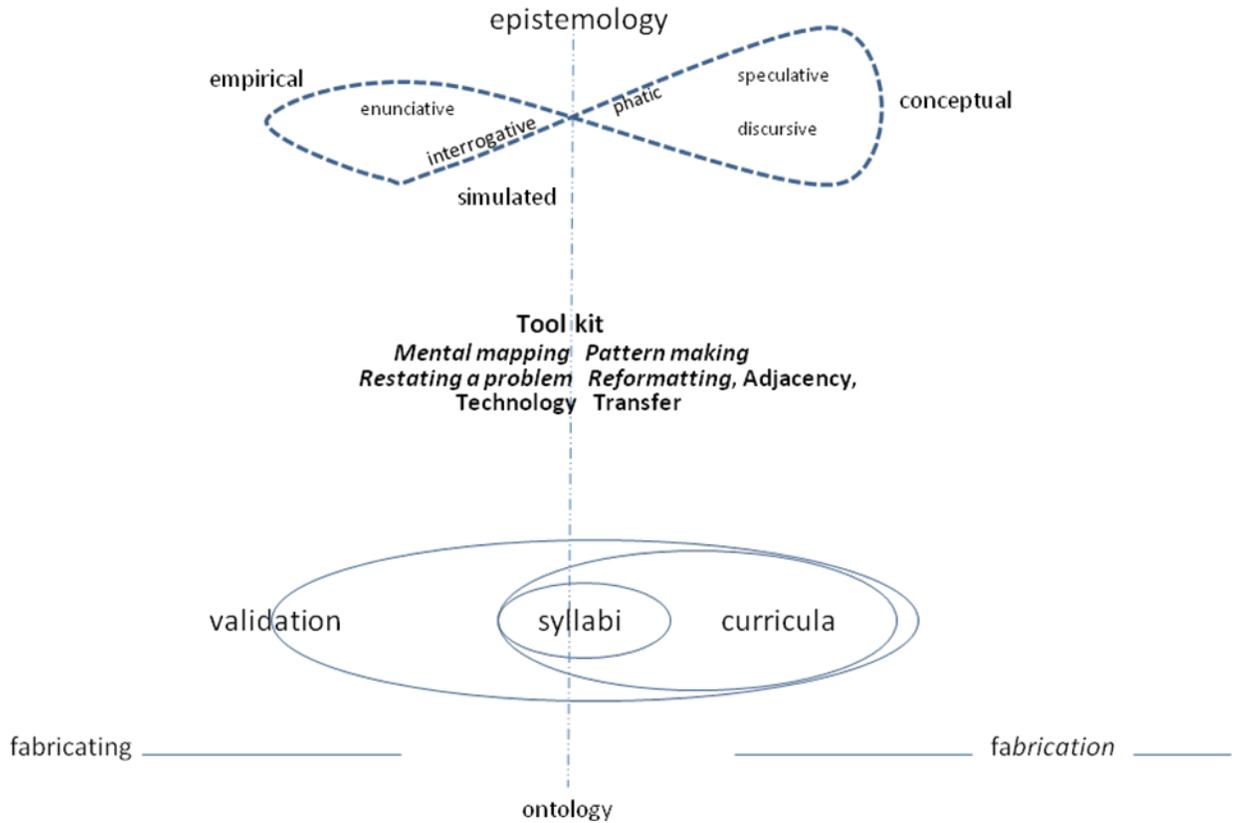


Figure 2-1. Knowledge diagram 02

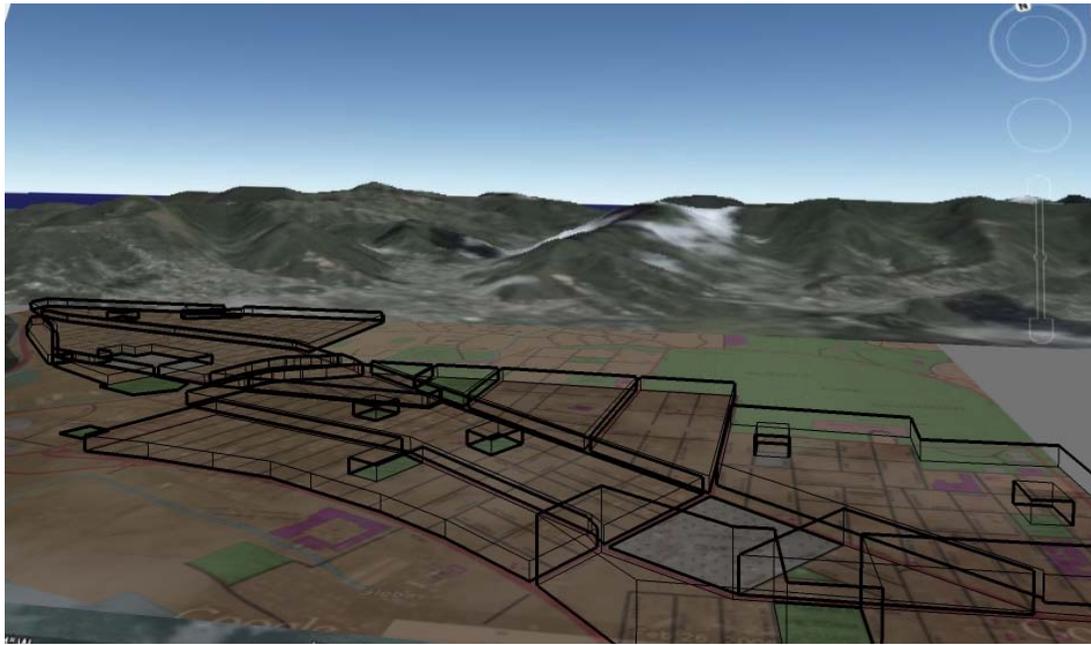


Figure 2-2. UF D3 urban studies of Port of Spain, Trinidad and Tobago.

CHAPTER 3 TACIT MEDIA

During my thesis year at The Cooper Union, John Hejduk walked into the studio and delivered the word aura.

My classmates and I had to discover what aura meant to us individually. In that year, Hejduk would visit the thesis rooms at random hours. Once while working in the evening, I felt a presence; quiet, of large stature and looming like the vaults of Chartres. In the darkness of the room he delivered a desk critique. He said to me, sometimes you come back to the same thing for a life time. We spoke about practice and the importance of working in one place, knowing your desk, the space and things surrounding that define your acts of creation. We spoke about books and he thumbed through my copy of Gunnar Asplund's Rizzoli 1988 publication, which traveled with me everywhere. At the end of that conversation, he said take care of your books and your eyes.

There are two issues I would like to discuss in recounting this memory. The first is how tools can be invented or used as probes towards invention, and the second is the idea of location as the integration of sentient body knowledge: the distal and proximal structure in tacit knowing.

Media and Medium

During the New York years, the chimerical⁹ light of the Caribbean found its residual in tone. My bit of aura was a movement within Mozart's Requiem, the *Sequentia: Lacrimosa* that became the text of the thesis. The program of music and architecture has constantly resurfaced in my teaching of design studio and theory.

⁹ Michele Serres, *The troubadour of knowledge* (Ann Arbor, Michigan: The University of Michigan Press, 2000), p. 17. Serres discussed this place as mysterious where the body is knotted to the soul.

The notion of Aura gravitates to Walter Benjamin's work on the modern condition. Malcolm McCullough discussed Benjamin's aura in terms of an archaic condition, the fading of authenticity that occurs when an object is reproduced, "when its aura fades, an artifact loses...its history, its cultural identity."¹⁰ Richard Sennett suspends authenticity as program in reading Benjamin – "aura- bathed in its own light, -to describe the wonder that a thing exists."¹¹ In my investigations between music and architecture, the objective is transcendence. Transcendence in the transfer of sound media to a visual medium, from fluidity, sounds waves, echo and reflection of a temporal continuum to a visual one. In translation, the object is not copied but interpreted. Its presence resonates.

Structuring Fluidity: Speculative Inquiry

Like water's space, colorless and transparent, it absorbs its context. Water is a medium and an instrument, it reflects, absorbs, transmits, diffracts and distorts matter causing visual interference. Drawing flow is contradictory, a drawn water scene can be static yet the water's energy can be represented. The calligraphic stroke of meditative flow, marks the transfer of dynamic energy into a restrained celebration of form. The abstraction of an ink blotch induces the incidental nature of flow. Water embraces life and death. As mass, its weight and foreboding depth of color engages the void. Its movement demands respect as well as acknowledgement of the potential strength and fragility of the human body. Water as a material can be carved, water sport people understand the dynamic of water through the tool used: Vessel, fin, board, bodysuit. The body's agility in water through the skill of operating a tool expands our knowledge of fluidity.

¹⁰ Malcolm McCollough, *Abstracting craft: the practiced digital hand* (Cambridge, Massachusetts: The MIT Press, 1996), p.46.

¹¹ Richard Sennett, *The craftsman* (New Haven, Connecticut: Yale University Press, 2008), p.211.

Materiality also carries its own knowledge; like water it carries its condition for making and its spatial language. The co-tangency of materiality and methodology in structuring knowledge is understood through a tool. In the connection between sound media and a visual medium the capacity of a medium to be fluid signals its potential to transcend the aural properties of the media. Concrete, like plaster changes states from powder to liquid; it casts movement. Wax also changes in states of fluidity relative to temperature. Wax can be luminous whereby it holds light waves. The aural conditions of fluidity, memory and residue can be materially bound. Material exploration of sentient perceptions of sound and vision can also be explored through touch. In *The Eyes of The Skin*, Juhani Pallasmaa's contemplates the touch of vision, "even the eye touches; the gaze implies as unconscious touch, bodily mimesis and identification."¹² What is the feel of sound, is it smooth and cool or rough, broken, dissonant?

For the plenum project, a UFSOA Design Studio 2 (first year pre-professional degree level-D2) syllabus assignment, our studio unit explored making visual sound. One of the graduate teaching assistants happened to be a violinist with a sibling composer. A student in the class had just transferred from being a music major to study architecture. This musical awareness of the two students infused the studio forum with knowledge and expanded the exercise of diagramming perception to a structural reading of the piece selected. We conversed about time, timing between measures, patterns and distinction of voices (instruments) in relation to chords. Great conversation for first year students. Three-dimensional diagrams followed with parallel investigations into qualities of light and qualities of sound, the latter restrained in dimension to cube forms.

¹² Juhani Pallasmaa, *The eyes of the skin: architecture and the senses* (Chichester, West Sussex, England: Wiley-Academy, 2005), p.42.

Translations of materiality from wax and plaster casts had mixed results, some casts set while others collapsed or didn't cure. There may have been numerous reasons, use of differing plasters, from different sources, the fall in atmospheric temperature at night, the preparation of the molds. This issue situated the material / dematerialized conceptual position of the project in the non-conceptual (physical) domain of problem solving. We had to reconsider the medium without losing conceptual integrity in the materialization or embodiment of thought. This kind of on-site problematic is often encountered in practice particularly with refurbishments or renovations.

Procedural decisions ensued. Fragmenting the cast diagram through section cuts was agreed after discussion with the wood shop manager. And although we could not discern why the plaster did not set, the plaster craftsman from the Fine Arts department was willing to give a talk on procedure with pointers the next time around.

I assigned drawing the section cuts as a way of inducing memory of the diagram but now as physical objects, the tactile cavity, void, could be occupied by the imagination and in assigning scale. The diagrams then had to be reconstructed as a provisional construct: wire scaffold. A group decision was taken to create nested transitional volumes (structural or volumetric) and insert these within the scaffold canopy. The day of critique was sunny, we looked at these translations outside in the atrium and what followed was unexpected and illuminating in the way Polanyi assigns intuition.

An understanding of plenum for this unit evolved out of a conceptual exploration of the intangible becoming body through the resistance of materiality. This resistance is an immediacy of phenomena, transferring from hand to hand, dexterity in thinking¹³ between representation

¹³ Michele Serres, *The troubadour of knowledge* (Ann Arbor, Michigan: The University of Michigan Press, 2000), p. 12.

and medium-media. The journey of discovery, investigation and transitions created an aperture for adjusting pedagogy based on the level of material knowledge. Plenum was discerned from the proximal relation of the first term of overhead condition and the second term making sound visible or tangible. The intensity of sunlight projected shadow drawings which registered multiple variations of the embodied music. The constructs visually compressed becoming diaphragms¹⁴; models and drawings simultaneously.

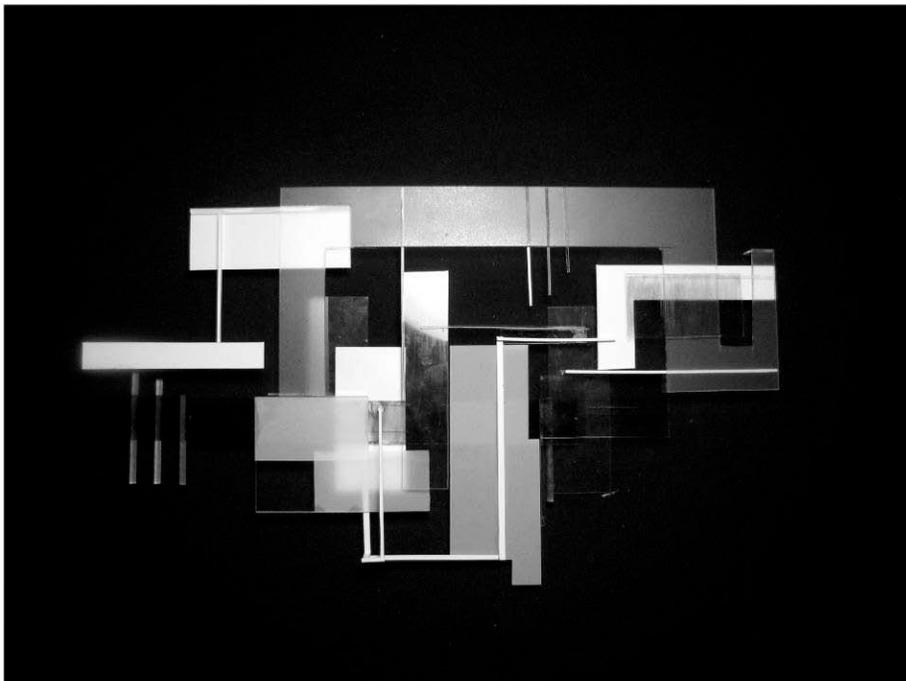


Figure 3-1. UF D2 aural studies 01

¹⁴ *Merriam Webster new collegiate dictionary, seventh edition.*(Springfield, Massachusetts: G&C Merriam Company. 1972) diaphragm: a device that limits the aperture of a lens or optical system.

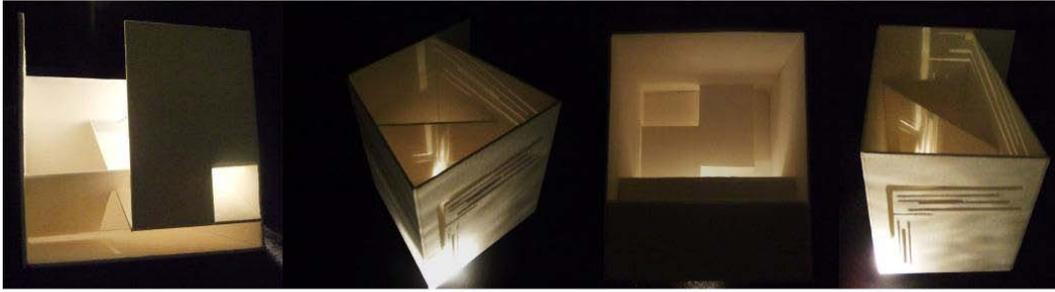


Figure 3-2. UF D2 aural studies 02



Figure 3-3. UF D2 diaphragm

Location: The Integration of Sentient Knowledge

Your seat, desk, drawing equipment, books, conditions of light and views are tools and extensions of self. The proportions of your body are all part of a personal ergo-meter and graph that transmits meaning into the things you make. If the studio (classroom) is a hot desk, this space tends to be more of an interior (private) domain with the capacity to operate in multiple sites.

Although the laptop makes us transitory, within the public domain, we still seem to find spots that carry the character of self. By sitting on the floor, on chairs, in a café by the window, a quiet spot, a comfortable position at the conference table, under a tree, near a particular mark or stain on the floor, wall, ceiling, within the passage of shadow, we carry the character of self.

By extension, positioning is metaphorical of the way you occupy a site. Where is the sun's position of most intensity? Which direction is the prevailing wind and how intense does it get? What if all these grand trees were removed by a hurricane? Where is my neighbor? How do I encase my electrical power supply? How can I direct natural light, harness the wind?

In the example above, the diaphragm as device displaces location. It collapses the tangible and intangible poles of the object and its re-presentation. The device evokes wonder in the in-between reading of its real and imagined self. It simulates the aural space of music in order to inhabit it.

The simulated constructs are locations of the enigmatic body. They occupy the memory of a temporal continuum. That is its site. Inhabiting these constructs posits the idea of locus as dispositional within a conceptual terrain of location.

In discussion of the location as the integrator of sentient knowledge, I will now focus on the personal computer and software tools of digital media as well as an experience from private practice.

Tacit Knowledge in Digital Media

With respect to tacit knowing as discussed in chapter one, the utterances of people are ultimately based on demonstrations, materialized entities as tacit experiences. In our capacity to experience the same neural processes of another person, we achieve gradual variations of indwelling. The independent nuances of this are a personal knowledge experienced through the body, a physiological knowledge. In digital media this knowing bridges interface with the instrument (digital system), cognition of its tools (various software) and the self-regulating extension of desk in the configuration of a toolkit. Discussion of these will be centered on software.

Software is used in studio as 2-dimensional and 3-dimensional spatial projections, from diagrams and highly constructed (modeled and rendered) structures to design aids in geometric parameterization (type and variation of type). The advocates for software integration in studio inquiry embrace the toolkit of operations, the mental modes and enactive relation to symbolic and iconic knowledge that this extension of our selves offers. The expanding ubiquity of software usage, its hermetic domain of activity, the point and click or roll, tooled distancing of ambidexterity that a tactile knowledge of things offers, I believe, are waves of resistance for design invention in the digital realm.

Of the drawing software I have utilized, orientation is structured by the Cartesian coordinates. Auguste Choisy's axonometry was synthetic in that it implied precision of measurements in the x, y, and z axes. Its abstraction anticipated the digital drawing realm. Orbiting while constructing a three dimensional model has realized a virtual dynamic of axonometric projection. The option for a user to change views, isometric, perspective and input camera angles and focal lengths, inserts the creator or observers presence into a drawing system. The multiplicity of views, orbited or constructed are cessations that approximate Husserl's

noesis. Each act of perception, *noesis* constitutes an overall meaning or manifested act, “noema”. The one-sidedness of any particular experience of an individual act is at the same time experienced through the *noematic* system. The phenomenological structures of particulars are nuances within tacit knowledge.

In the early versions of AutoCAD, the flexibility to create an object type as blocks for reproduction and/ or exportation left authorship in the domain of the user. With real time transformations evident in Building Information Modeling (BIM) software like Revit, the capacity to create family types remains but is more imbedded in the specific command route of grammar. The advantages of real time approximate the notion of orbiting in that one creates within a system of multiple versions.

By constructing in 3-dimensions, the simultaneity of correlated drawings positively increases thinking in 3-dimensions. An object’s sections and elevations are simultaneous with plans. Parametric assignment of family types in Revit is limited. The user can develop a unique family type or eyedrop a component from a web library. The limited base pallet increases the necessity for a personal development of work space and tools. The participation of any user in configuring their work space integrates a personal profile of information with an electronic network community: a personal library with access routes embodying an individual mental map. Mental mapping constructs the relative importance of information (a hierarchy) as a dimension system of interface with navigation operations. The aspects of software operability that affect the re-configuration of space include:

- Real time: real time has the potential of group collaborations on projects from authors in different physical locations. The potential for a virtual school exists as long as practicalities of compatible computer system profiles for processing are consistent and the user’s agility in the software tool being utilized is somewhat equivalent.

- **Interoperability:** the interoperability of software via the translation of file types also offers image construction and transferability of points of view in montage construction. Examples of 3-dimensional renderings, superimposed with vector drawings and imported into pixilated layered images explore the simultaneous aspect of sentient perception.

Varied points of view that are realized in the assembly of your interface, are an extension of your desk. The docking of tools, opening the pallets you use, ergonomically scores an individual itinerary, the path of least resistance, logic for creating and making with the software.

The selection of your software and portals for communication via your navigating system creates identity. This is a personalized tool, like the fountain pen whose nib is an impression of the weight your hands' dexterity as it distributes strokes of ink.

Software Tools

During this academic year I have been working on a research project with the UF School of Architecture. The project is entitled, "Pedagogical development and Curricula integration of Digital Simulation techniques for Solar and Wind Effects on Passive Design Strategies." The stages of the research included software evaluation, selection and testing, with the aim of identifying a pedagogical strategy for implementation. The preliminary criteria for software selection included the following: the type of climatic or environmental analysis simulated, the date of the software release or update, availability of academic licenses and/or student downloads, interoperability and the availability of literature for example, white papers and resource centers that supported learning and communication between tool and user and/or product and user.

It was found that Ecotect for environmental analysis and Ansys Inc Software Product for Computational Fluid Dynamics (CFD) were the choice of software utilized in architecture schools by three of five academic institutions. Ecotect was procured by Autodesk during this study and although the program operates only with the Windows operating system, the range of

Autodesk 3D drawing products including Revit Architecture, Maya and AutoCAD 3D as well as its availability to the Academic community with free student downloads were determining selection factors of interoperability and portability. Climate Consultant 4 and Psychrometric Chart Tutorial (2008) are also probable support pre-modeling programs for site specific conditions.

A survey questionnaire was administered, by non-random assignment for practical reasons, within a particular studio or digital media course to individuals who were using one or any of the above-mentioned pre-selected software. Respondents were students with experience ranging from undergraduate to professional. Learning domains varied across Lab, Lecture, Studio and Home situations and were interdisciplinary inferring portability outside of software quality (design and performance) measures. All students were first-time users of the software with fifty percent at the novice level. Time spent interfacing ranged from 24 hours to 36 hours to other, per week. Prior and fluent digital media knowledge of one respondent did not seem to vary the results of the surveys significantly.

The software utilized by respondents included Autodesk Revit and Autodesk Ecotect and Energy 10, which is “the result of a collaborative project of the National Renewable Energy Laboratory, Center for Building and Thermal Systems, the Sustainable Buildings Industry Council (SBIC), Lawrence Berkeley National Laboratory, and the Berkeley Solar Group.”¹

The Revit and Ecotect software ranked high on its communicative variables. These included system performance, ease of software use for quick as well as complex studies, legibility of data feedback and pattern of use and a recognizable range of commands. Interface

¹ National Renewable Energy Laboratory (2008, July 25). Buildings Research Energy 10. Retrieved January 23, 2009, from <http://www.nrel.gov/buildings/energy10.html>

and language comparisons were marked with AutoCAD, Civil 3D and Design Builder for Ecotect and AutoCAD Architecture for Revit.

Energy 10's communicative variables ranged in results, yielding high efficiency of system resources and software, medium ease of use for preliminary or quick studies and very difficult use for complex analysis and simulation, suggesting complexity of language recognition. Although data feedback was easy to interpret, the respondent consistently marked no guidance in problem solving by the software providers. No guidance by way of workbooks, online tutorials, website or online forum support. A primary obstacle was noted as "Energy 10 cannot build a model, only input numbers."

The Revit and Ecotect respondents ranked the reliability of software interface support accessible by way of online forums, peer groups and electronic workbooks however, not through books or journals. These results suggested a high Usability under ISO 9000 standards inferring Portability. Interoperability with both Windows and Mac Operating systems is limited although plug-ins across the Autodesk suite of software are possible. Once the software had been selected we focused on its direct application to a specific building analysis. Again, the general skill range of the users varied from the advanced digital practitioner to the novice. Each student had differing approaches to the learning process between the Autodesk Revit and Ecotect. All four students undertook different cases studies and with differing degrees of documentation. Information or data varied from measured sketches to measured drawings, design development drawings and construction drawings.

Climatic analysis, with the Ecotect software required a simple model. This meant minimizing these drawings to diagrammatic data. The drawings are approximations of the actual artifact. The importing format was one of the first obstacles we encountered. Online tutorials

were very useful. One student with a background in engineering spearheaded the journey, sourcing two valuable tutorials and e-mailed these websites to the rest of the group. We figured out by error that model units (imperial vs. metric) when importing the DXF file need to be in metric, otherwise there would be no accuracy of building scale. The model had to be imported without triangulation, and non-essential element layers edited out. Once imported, we had to figure out how to generate zones. Assigning material properties to elements of each zone would become critical for thermal analysis. Very early we realized that although we had varied experience in software knowledge, it was best to work together in the same location/room so we could communally try to untangle interface problems, issues of language acquisition and forging mental maps. In the functional relation of tacit knowledge, we are aware of that from which we are attending: mental mapping to another thing and thus construing virtual space. These navigation and cognition factors are elements of skill acquisition.

Skill acquisition of software also occurs on multiple tiers between the programmer and the general user. Generally, the Graphic User Interface, the modeless² operation of command prompting and the systemic development of mental model patterning, increase perception and cognition at universal and individual scales. Recognition of icons and recognition of similar functions of icons between varied drawing and imaging software internalize action patterns reciprocating skill and practice. The internalization of these parts as Polanyi notes in the structure of tacit knowledge makes ourselves dwell in them and the inverse to externalize them is apprehended by our dwelling in “the boundary conditions of a lower principle on which a higher

² Malcolm McCullough, *Abstracting craft: the practiced digital hand* (Cambridge, Massachusetts: The MIT Press, 1996), pp. 158–162. McCullough explains modeless as where you decide what the system does next without its prompting.

principle operates.”³ The higher principle in this instance would be intent. A hands-on day workshop conducted but an Autodesk representative accelerated this process.

The all day Autodesk workshop clarified many issues with interface and interoperability between 2010 Revit , 2010 Ecotect and Green Building studio introducing the html file and their reporting potentials. We worked with 2009 Revit and 2009 Ecotect. The tendencies of Ecotect were described as effectiveness in preliminary design development with many variables testing multiple assumptions. As we started from the position of a known object, the climatic analysis with Ecotect would be most effective if a specific hypothesis could be identified and tested across the field of analyses.

Weather tool

There are numerous charts of detailed climatic information that can be generated with the Ecotect weather tool. This information is location specific and downloadable from the United States Department of Energy and Square One websites. The tabulation of climatic data is typically available in different formats: TRY (test reference year) TMY (typical meteorological year) and WYEC (weather year for energy calculations) the US Energy site offers EPW, Energy Plus, STAT and Zip files of both. TMY^s range from 1960^s to the most recent: TMY3. Not all global positions are available on these sites. In loading the climatic data for the Caribbean, I found that most of the islands are hosted on the Square One website; this information is in a DAT format, numerical and requires manual translation and assignment of values. As the weather tool fixed format starts its values at 0 instead of 1, the FixedFormatdat.file is not easily correlated 1:1. I found this translation problematic for assuring accuracy, the format tab of the

³ Michael Polanyi, “The Structure of Consciousness,” in Marjorie Grene, ed.. *Knowing and being* (Chicago, Illinois: University of Chicago Press, 1969), p.214.

import dialogue box has a TMY value but when this item was selected for two locations in the Caribbean, the weather data did not appear in the weather tool grafts. I had to locate an available TMY file with the nearest longitude and latitude relation to Grenada WI, the location of my case study. I found files for Martinique on the US Department of Energy website. For the purposes of this study the variation in solar radiation would not be as problematic as opposed to a computational fluid dynamic analysis of wind in the differences between Fort-de France and Westerhall Point. In addition, climatic data for particular locations, for example rainfall data may require manual input.

Charts generated from the weather tool allow for highly visual readings of general annual conditions and specific time of year or day, (Figure 4-1) and (Figure 4-2). From these, cross references between radiation, humidity and wind for example, interpolate the specificities of what season of year and what time the highs, lows and means occur into a generalized understanding of evaporative cooling of an island territory. I isolated March, June, August and December as strategic weather stations for the solar and thermal analysis in Ecotect. Another very useful chart in the weather tool is the Solar position optimum orientation and solar radiation charts. These allow composite reading of an ideal on earth location for reduction of solar gain as opposed to an existing condition. The heat losses and gains in the differences between these two conditions alone can generate multiple exercises for climatic design students as a tacit learning tool. The gleaning between particular analyses in relation to the comprehension of a whole macroclimate context navigates dwelling.

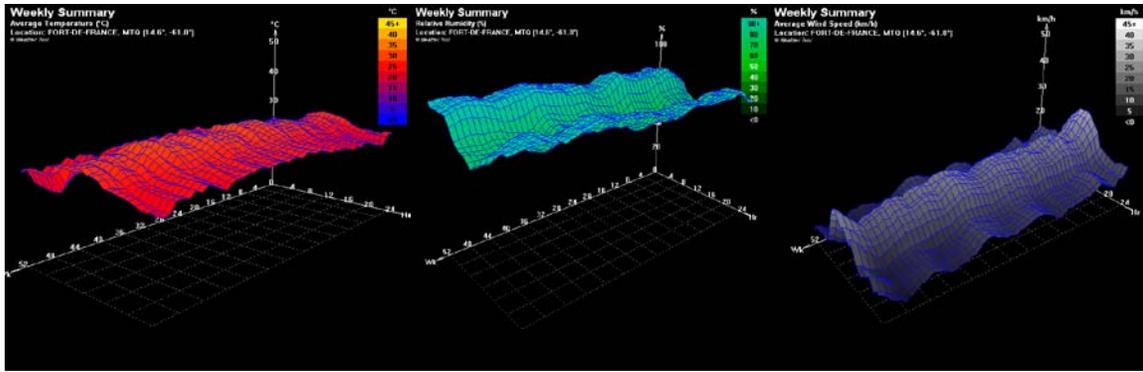


Figure 4-1. Radiation, humidity and wind charts.

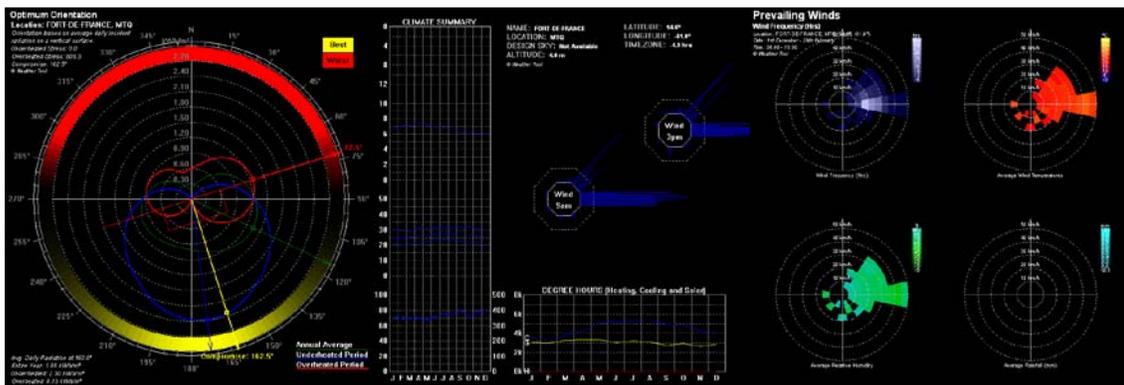


Figure 4-2. Solar positioning and general annual conditions charts.

The workshop allowed us to also focus the scope of the research. An aspect of Ecotect is its inability to detail air flow such as convection loops or single zone vertical stratification.

However, with this limitation, it is able to:

- Simulate the sun path and contextual impact so as to map sun and shade patterns throughout the day.
- Calculate or approximate indoor and outdoor temperatures, and influences on the building envelope.

- Determine approximate thermal values of building materials. This data is assigned through material selection of the floor, wall, ceiling, roof and other building elements. The materials pallet is limited; however U values can be input manually. Color assignment may also alter these variables. Composite material cross sections of construction elements can also be assigned. This is an important factor for non temperate climatic zones. Like Revit the materials pallet for these kinds of automated or parametrically controlled programs need expansion for a personalized kit of parts.
- Determine the consistency and effectiveness of shading and cooling strategies.

The determining of immediate and regional contextual conditions (e.g. coastal, hillside and valley) would be possible if integrated into the zone as abutting zones and or reconstructed elements. The following analyses were carried out in order to address the above mentioned scope of the research.

Solar geometry

The sun path and contextual patterns generated from solar geometry were more comprehensive than the Revit modeling of the annual and daily sun path. The Ecotect model may also be viewed in section so one may ascertain where the combined azimuth and altitude angles occur within the volume. These sectional views read in conjunction with the solar range butterfly diagrams,(Figure 4-3) assist in a 3-dimensional visualization of the temporal aspect of light and shadow, inversely radiation and or cooling of the building.

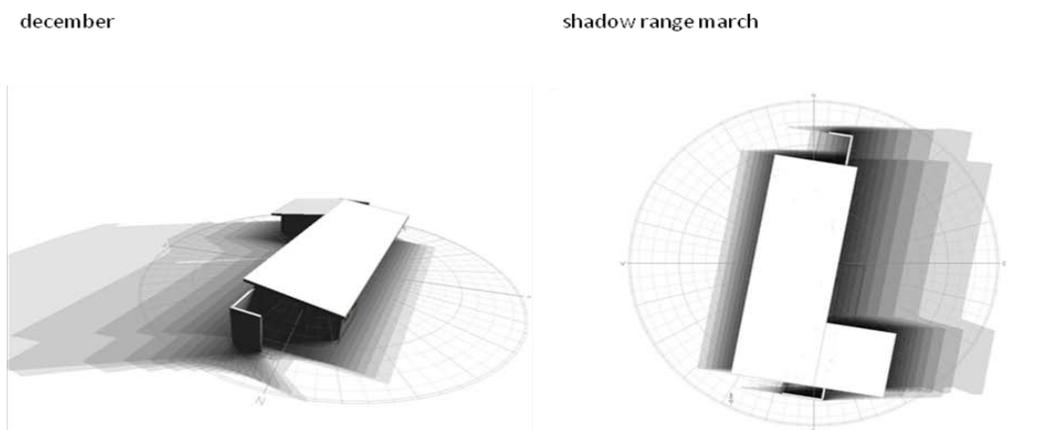


Figure 4-3. Butterfly diagrams

Thermal comfort

The objective of my analysis was to assess thermal comfort in relation to solar radiation. I isolated the open volume of the case study, assigned materials and discerned the thermal properties of this zone. I intended to measure assumptions on how this open zone modified the comfort of the entire building section. For the thermal analysis output, the correlation of daylight analysis with the sun path studies appeared to be accurate for the open volume. However, there was a discrepancy in the daylight analysis chart for the entire building. The issue may have been how the software read the voids. Voids in the zones were modeled as complete openings in the building envelope. The daylight analysis for the entire building may have been accurate by indicating that the south west volume would receive the most amount of daylight. If so, the Mean Radiant Temperature of that zone should have been higher in centigrade degrees than the north facing side of the building. In assessing the overall thermal comfort, the data indicates a required air velocity of 2.3m/s to mitigate radiation. The ambiguities in the clarity of output would require a more in-depth focus on thermal analysis. Unlike other imaging software Ecotect is an analytical tool. One advantage is that the output is not limited to numerical data, the data is visual. A disadvantage is its ability to generate form primarily in the horizontal, analyzing through the plan. A strong asset is its importation of 3-dimensional building files in its designated orientation relative to the compass north point.

Pedagogical Positioning

As student and researcher actively engaged in the thing being studied, I have been immersed in acquiring agility in digital media. By learning various software tools, I have been able to hone an approach about the potential relationships between these tools and studio inquiry. This point of view has been informed by doing. The digital modeling of a series of Caribbean modern objects served two functions. It documented works of architecture relevant to the body

of pedagogical reference in history, theory and climatic design. The document as artifact is at once conserved and malleable. It can be altered, thus becoming a tangible and intangible work for probing questions about passive design. As a digital entity, it can be communicated across tropical and sub-tropical territories and inserted in any location.

The adaptation of a universal building and aesthetic system was one of the mandates of the modern movement. Regional strategies imbedded in built entities offer a comprehensive body of empirical knowledge in the adaptation of machined works of architecture. The knowledge is integral with systemic ways of making or crafting architecture as is evidenced in recent publications that document modern object in the Caribbean. Through this symbiotic condition of a formal adaptation to the tropical zone, a regionalism is rooted historically. Few examples of civic structures of the early 19th century that were modeled from European pattern books still exist. These models were adapted or creolized to suit climatic needs. The shed or piazza, is a fenestrated envelope, an indoor/outdoor space. The piazza is an identifiable element of Jamaican Georgian architecture. The modern movement's brise-soleil is also varied in its reinvention in the tropics. The creolized element results from a sense-reading and sense-giving operation. The adaptation is an intellectual reading of lived experiences in that climatic zone. Tangentially, the digital artifact as a malleable, real-time construction implicitly offers sense-reading and sense-giving relations that materialize in the formal variations of parametric climatic elements. Moreover, empirical knowledge as models, can be correlated with digital analysis as a means of understanding the effectiveness of both. The pedagogical intent resides in the boundary conditions of specific probes.

The personal computer and its software tools transform tacit knowing in the way that we perceive sentient experiences through mental mapping, representation and navigation within an

objects spatial field. The electronic device and its media⁴ extend the range of tacit knowing. In the understanding of intent we transfer knowing to knowledge. This transfer is movement that oscillates across thresholds of intent, instilling insight or communication in its virtual orbit. Knowledge is the medium⁵ imbued with skill. By skill I mean a combined relation of skill as ability with the software tool and intuition. Skill can be intuition, in Polanyi's words "rooted in our natural sensibilities to hidden patterns and developed to effectiveness by a process of learning"⁶. The combined relation integrates sentient experiences of the natural environment with the digital realm.

Whether or not a sentient knowledge of location on earth (a macro-climate condition) is understood as the intuitive grain in the tacit knowing of place through the use of climatic software is conjectural. Knowing micro-climate is understood by the lived, felt experience of place. The humidity of Gainesville in the summer is unbearable. Although the weather tool infers a North East and North West wind that cools in the evening between the range of 20-30km/h, the density of trees seems to deflect that cooling of my skin; the buildings' envelope. However, lived experience of varied climates allows one to tacitly know what 14 knts. of wind, or its above noted equivalent, feels like. This skill of intuition intervenes in knowledge acquisition and offers ways of sensing micro-climate associatively across the various weather tool data. Inversely, kinematics, the study of constant motion in serial mechanism and the analytical mapping of this abstracted structure, can inform our tacit knowledge of place. This can be achieved with digitally

⁴ Media : *pl* of medium, a substance regarded as the means of transmission of a force or effect. *Merriam Webster new collegiate dictionary, seventh edition.*(Springfield, Massachusetts: G&C Merriam Company. 1972)

⁵ Medium: a channel of communication. *Merriam Webster new collegiate dictionary, seventh edition.*(Springfield, Massachusetts: G&C Merriam Company. 1972)

⁶ Michael Polanyi, "The Unaccountable Element in Science," in Marjorie Grene, ed., *Knowing and being*, (Chicago, Illinois: University of Chicago Press, 1969), p.118.

simulated solar geometry. Resolution of these variables is deposited in the intervention, the climatic archetype, and its adaptation.

The pedagogical positioning of Ecotect can take two points of departure. The software tool may be imbedded in the matrix of curricula in a way that sequentially fits the competencies of environmental studies. The software tool may also be independent of sequencing competencies and act as a catalyst. With such specificity there is a potential for expansion which could engage curricula at multiple levels.

If skill acquisition of the tool is imbedded, two pre-requisite courses combined with less mediated experiences of the environment would be necessary. The student would then utilize the software and experience the micro-climate of place. These courses would be preliminary knowledge in environmental technology so as to understand units of measure and composite thermal graft and knowledge of drawing digitally, preferably with interoperable tools. The interdisciplinary nature of the project in conjunction with scale and site of project would be factors that influence the tools effectiveness in learning. Complex 3-dimensional modeling and material assignments of element may not allow the comparative analysis of temperature, humidity, radiation and air movement variables.

If the tool becomes a catalyst, its speculative capacity in technology transfer would generate a broader operative field. Points of departure could include: aspects of mental mapping and interoperability which have been discussed previously in this chapter as translations between drawing file types. These translations in juxtaposed relations or diagrammed modes of analyses could be considered abstractions or armatures for further perceptual studies between the actual, simulated and virtual. For example, if we utilize the butterfly diagrams (Figure 4-3) as a point of departure, we can generate a specific solar geometry range from the object body, the artifact. By

suspending the body, making it transparent or creating a void in its place, the temporal field becomes autonomous. The field of resonance defers assignment of a fixed place succumbing to the earth's solar rotational path. This field as text is mnemonic and fluid. As context it expands the conceptual potential for pedagogical intervention.

Both the discursive and speculative points of departure for Ecotect, bridge the tangible and intangible aspects of tools skill range, (Figure 4-4).

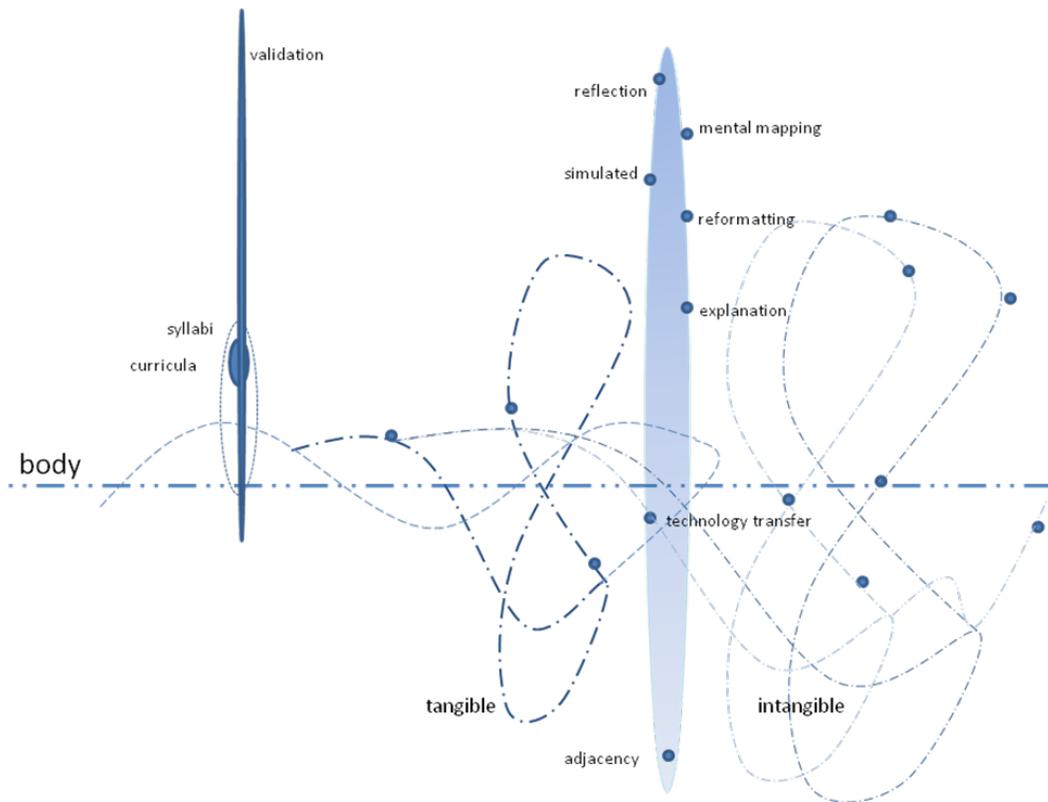


Figure 4-4. Knowledge diagram 04, Ecotect pedagogy positioning.

CHAPTER 4 DESK: THE TACIT CONTRACT

In 1993, I embarked on private architectural practice with two other partners and we established a limited liability company. In 1994, we received a national award for the design of two monuments. These are enshrined in the nations Heroes Park in Kingston, Jamaica WI. I would like to discuss the locus of these objects as part of the collective memory of citizenry. As artifacts, they are somewhere in between sculpture, and an architectural object. As works of architecture they shelter. They are inhabited mentally and physically.

Identifying an essential quality of the national figures these objects would enshrine, meant identifying an essence that would resonate symbolically with citizens. We had to create artifacts that would embody a shared history and future aspirations, artifacts that would be made well, to weather climate and perpetual use. In Alan Colquhoun's discussion of figures or tropes, he suggests their effectiveness resides in their synthetic power; they "crystallize a series of complex experiences which are diffuse and imperceptible."¹ Colquhoun discusses gestural figures as a means of arousal, facilitating memorizations of ideals.

The two abstract monuments activate a symbolic memory. In the example of the monument to Nanny of the Windward Maroons,² we described the project like this:

"Central to the theme of the memorial is the sound produced by the conical element that crowns the main vertical structure. The sound of the Abeng, so crucial to the Maroon's tactics against the English soldiers, echoes metaphorically through the involutes' spiral

¹ Alan Colquhoun, *Essays in architectural criticism modern architecture and historical change* (Cambridge, Massachusetts: MIT Press and New York, New York: Oppositions Books, 1989), pp.191.

² Jamaica National Heritage Trust, "Competition Brief," Marguerite Curtin, ed. (Kingston: Jamaica National Heritage Trust, 1993) *'She rises out of the ground, evoking the spirit of a female warrior, Queen Mother, a respectful figure of power and authority.'* It is speculated that Nanny may have been of West African, Akan (Ashanti / Fante) origins, a free woman who never allowed herself to experience enslavement. A leader of the Windward Maroons during the first half of the eighteenth century, her history resounds as a tactical and unrelenting fighter against the English soldiers during the First Maroon War of 1734 - 1739. Nanny's first tactical outpost was located within the Blue Mountains and as such, her memorial, located to the east of the park, with the Blue Mountains as a back drop.

formation at the base of the memorial. The secondary vertical structures with their pivoting arms and Cacoon heads are kinetic. They represent Nanny's Maroon guerilla warriors sensitive to the slightest stir of the wind." Compass Workshop Ltd. 1994

The Abeng and Cacoon symbols are recognized by the collective citizenry and act as mnemonic devices, they aid in denotation. What we also aimed at was creating acts of beauty: tectonically meaningful work. We induced a new formal language of the gestural body whereby expanding cognition of the collective memory from metaphor to metonym; from simile to association. In translating or transferring an abstraction of anthropomorphism through the symbolic, the collective memory is bathed in its own light; the misnomer of monuments or memorial was deemed superficial. The focus here will now be on what design decisions became factors in constructing these objects.

The body's agility in practice through the skill of operating a tool expands our knowledge of craft from concept to concrete entity. The body is the extension of my desk; the position of architectural practice and its signifier, the knowledge of contractors, subcontractors and artisans in the manifestation of a project. There is a material history of cement on the island since the 1907 earthquake. Its realization attained resolute crafting in concrete shell structures from the desk of Wilson Chong. The plasticity and formal accuracy, linear and curvilinear, that we could achieve with concrete, informed a primary material choice, as did the tangible consciousness of its crafting, of its presence. Concrete was more economical than travertine or marble, an imported material. The continuity of the involutes' sections of the Nanny monument would have required the milling of travertine or marble which meant employing imported products. The cement factory in Kingston produces from the land. The tensile material, the metals had to be imported. In the nomination of metals, we selected stainless and corten steels for their resilience to coastal erosion. These were the two main materials utilized.

The social complexities of constructing in Jamaica affect security of the site (labor and materials). Some locations are more volatile than others. The scale and visibility of the project are determining factors. The strategy for construction was to create several tender packages, differing phases with differing contracts and subcontractors, for example, packages for the foundation, super structure, secondary structure, artisans for fine detailing. Both monuments at either end of the National Heroes Park grew incrementally. “One one cocoa full basket” is a miserly Jamaican proverb which in this instance meant securing the site. Off site fabrication of pre-cast components, metal kinetic and iconic elements limited on the ground time to foundational work, erection, electrical installation (minimal) and landscaping. Shop and site meetings were more efficiently managed and, more importantly, quality of craft assured.

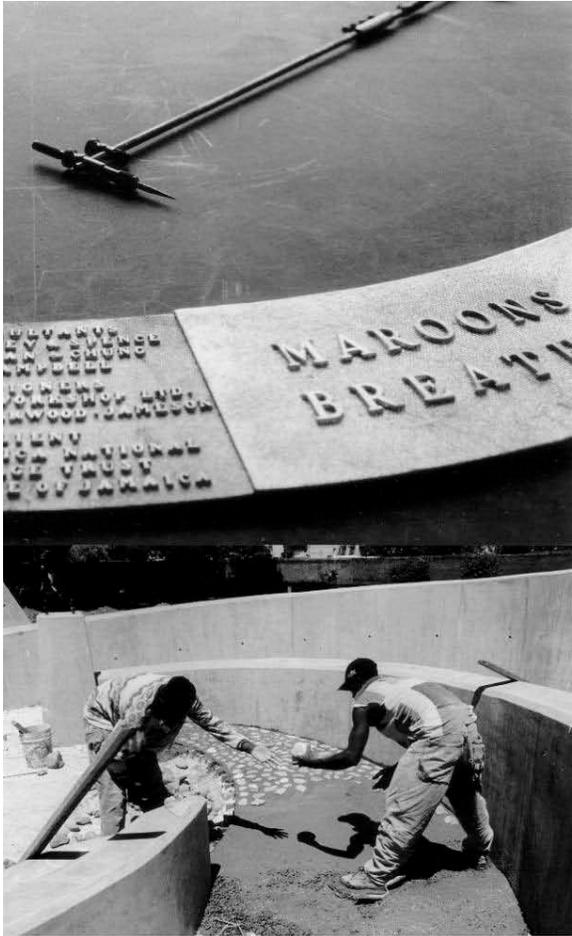
The dialogue between our studio-workshop and the concrete and steel workshops fused design skill and making skill. The empirical discourse is detailed in every aspect of making, from casting yard to review molds; plywood and stainless steel, to confirming and adjusting dimensions of the location of seams/ joints, to agreement on the kind of pour, of aggregate, of reinforcement, finish, plugging methods for transportation, and verifying samples. There was repetition in the pre-cast forms; however the moulds were never reused. Each component had its own mother mold. We had numerous visits to the steel yard to confirm the welding beads, the conical section of the Abeng, the exposed connection to its precast base and the insertion of its sound-making device. These workshops had not produced such forms before so there was reciprocity of knowledge that occurred.

We also sought to resolve problems by finding the right fit, the appropriate knowledge base that resided in the skill of the community. The knowledge can be imbedded in academia or the history of a place. An example of this is the visit with Professor P. Lodenquai, physicist at

The University of the West Indies. The department had exploratory sound models, and this informed the sound instrument for the Abeng. Mr. Bruder's (an emigrant to Jamaica from North America during the Second World War), foundry knowledge and skills which once infused the Edna Manley School for the Visual and Performing Arts, was treasure-hunted. He hand-crafted the lettering for the signage emblems and forged them in aluminum. The tacit contract engages a social collective. The contract binds craft with community in order for the act of making, of practice, become an intellectual reading.

Malcolm McCullough in *Abstracting Craft* discusses an instrument as a form-giving tool that demands refined practices. Like a musical instrument that requires practice to play thoughtfully, the tacit contract of mind and hand operating as instruments of practice, measure extension of self in place-making. The actualization of a project relies on bridging skill terrains of this tacit contract in order to make space intelligible. Communication, with words written and spoken, with drawings at varying scales, (in our case 1:1), with models, with the accuracy of geometry, with material mock-ups, with material research and the exigencies of locale, within this meta-language makes imagery resolute. The cyclical connections between the signifier and its object, establishes meaning. The tacit contract builds insight. For Octavio Paz, the bridge spans use and contemplation: "In the work of hand-craftsmen there is a constant shifting back and forth between usefulness and beauty. This continual interchange has a name: pleasure. Things are pleasing because they are useful and beautiful; this copulative conjunction defines craftwork, just as the disjunctive conjunction defines art and technology."³

³ Malcolm McCollough, *Abstracting craft: the practiced digital hand* (Cambridge, Massachusetts: The MIT Press, 1996), p.9.



copyright Compass Workshop Ltd. 1999

Figure 5-1. Monument to the Rt. Hon. Nanny of the Windward Maroons, Kingston Jamaica.

CHAPTER 5 CONCLUSION

Cultural complexities are like school cultures, how one crafts social, instructional and administrative criteria is an extension of your desk: practice. Interaction with people in the micro culture of context negotiates imbedded histories and meta-languages of the particular and universal. Tacit knowledge is grounded here in the micro-culture of context. Architectural education informs practice. Architectural practice relies on academia, as critic, a position of its theoretical other. Practice mirrors education with differing constraints. Academia is a speculative and interrogative forum on current and historical paradigms in architectures' materialization. Practice is the empirical field of production, where the tacit contract is evident not only in communication between team members but also within the limits of building codes, statutory regulations and professional indemnity. The engagement of the practitioner in education creates a vital conduit of knowledge transfer as does the educator in architectural practice.

Negotiating the relational boundary of education and practice (beyond internships and fulfillment of other academic criteria) touches on ethical complexities of student participation in design competitions and building projects. Other interfaces, for example faculty consultancies that offer solutions to problems at the community level, are beneficial to the visibility of academia. How purposeful such proposals become depend on the participatory level of the faculty and the service offered to the community. The practitioner, however, enters the design studio more seamlessly. Donald Schön's reflection-in-action exploits this relationship. Inquiry for Schön is a conversation between student and practitioner with drawing and model iterations that develop in the resolution of a design. His complete context is a way of teaching within studio that is imbedded in school cultures. It is not a universal proposition, the contexts of practice and of the studio are changing rapidly.

There are numerous factors affecting practice and education. In this neoliberal global economy, practices have ventured beyond traditional locations. Increasingly, large, medium and small architectural practices leave national borders to procure engagements. Territories like CARICOM have increased scrutiny and regulations in the awards of tenders through the national contracts committees in an effort to protect the regional market. Practice demands global partnerships. This tacit exchange of building knowledge and craft expands methods of construction dissolving the idea of a complete context into polyvalence. Digital media and its technology, bridge communicative gaps across language and identity thresholds, increasing efficiency in the construction process across territories. In education, as universities rely less on governmental funding and fees to meet budgetary constraints, departments become more like independent architectural practices. The demand on faculty to maintain academic standards with less human resource reclaims the imbedded knowledge of faculty members. This reduces a capacity for independent scholarship in lieu of team work and group research projects. Teams may not be limited to the scope of the faculty but extensions of each member bridging territories.

In the domain of studio culture, learning theories and speculative inquiry of pedagogical tools can inform both the education and practice of architecture. Constructivist theories of learning, are open and adaptable structures, which yield meaning and application through specific disciplines¹. These theories generally assume that individuals construct their own cognitive structures as they interpret their experiences in particular situations (Palincsar 1988).² The elements of Piaget and Vygotsky align with the socially constructed knowledge of

¹ Anita Woolfolk Hoy & Wayne K. Hoy, *Instructional leadership: A learning-centered guide* (Boston, Massachusetts: Allyn & Bacon, 2003), p 105.

² Ibid

architecture as generative production. This approach to education which centers on team building and the independent natures of individual members, harnesses the structure of tacit knowledge.

Some pedagogical parameters have been investigated in this thesis. They traverse scholarship and research. They embrace the fluidity of less tangible mediums and identify tools that displace meaning. The body, the assimilator of tacit knowledge, has been utilized as an instrument for tracking tangible and intangible domains of its materiality. The body as subject transgresses urban space. The body is studied within several frameworks, phatic, enunciative, discursive and speculative. These frameworks are extensions of empirical, conceptual and simulated knowledge systems. Intuition in the urban case studies is marked by adjacency, reformatting, gravity of technology transfer and the surprise. Re-presentations of the actual place recondition the body into a suspended state.

The suspended body is then probed as fluid media, the intangible and aural. Its inter-textual translations negotiate transcendence. This movement opens pedagogy to the illusive capacity of materials and method. This opening provides opportunities for revealing the embodiment of perceptual experiences. The body is revealed within a new conceptual terrain.

As digital media, the body retains an intangible state, becoming less tactile. It is now media, medium and tool; an integrated software tool and digital system. Re-presentation of place recurs and the body recalls its actual self as subject. Transgressing the phenomenal aspect of tacit knowledge, interrogations of self-representation are configured through varied software tools. In reformatting and adjacency, an intuitive leap occurs. Skill is uncovered through mental mapping. Possibility is revealed. It connects the configuring of the tool with a path of least resistance. In this gap, the crafting of intuition is denoted. Intuition as a process registers the operation of tacit knowledge within an analytical method. Together, a skillfully considered and applied method

that is inclusive of an intuitive process, constitute this pedagogical tool-kit. (Figure 6-1 and Figure 6-2).

At the macro-level tracking tacit knowledge is the practiced acquisition of skill. Skill at this level is the logic of tacit knowledge. This Skill is necessarily supported by Reflection. The logic of tacit knowledge can be utilized as device or filter in understanding the symbolic function of a tool, prod or prosthesis. A symbols mnemonic capacity can bridge school culture and community ideals. Tacit knowledge does not deny intuition but validates it so as to bring into being the full capacity of perceptual knowing we have accumulated. Richard Sennett states intuition can be crafted, tools used help to organize in our imaginative experience, limited and all purpose instruments enable us to take leaps of imaginative repair, repair of that retinal, and obscured image of sensations experienced. The educator's role in studio and practice is to guide but also to listen, grasp and nurture the cumulative process of Sennett's intuitive leap. Some skills in making may require consultancy in agility, but if we are perceptive we can locate the right tools and instill cognition bridging procedures in the studio within the faculty and in practice.

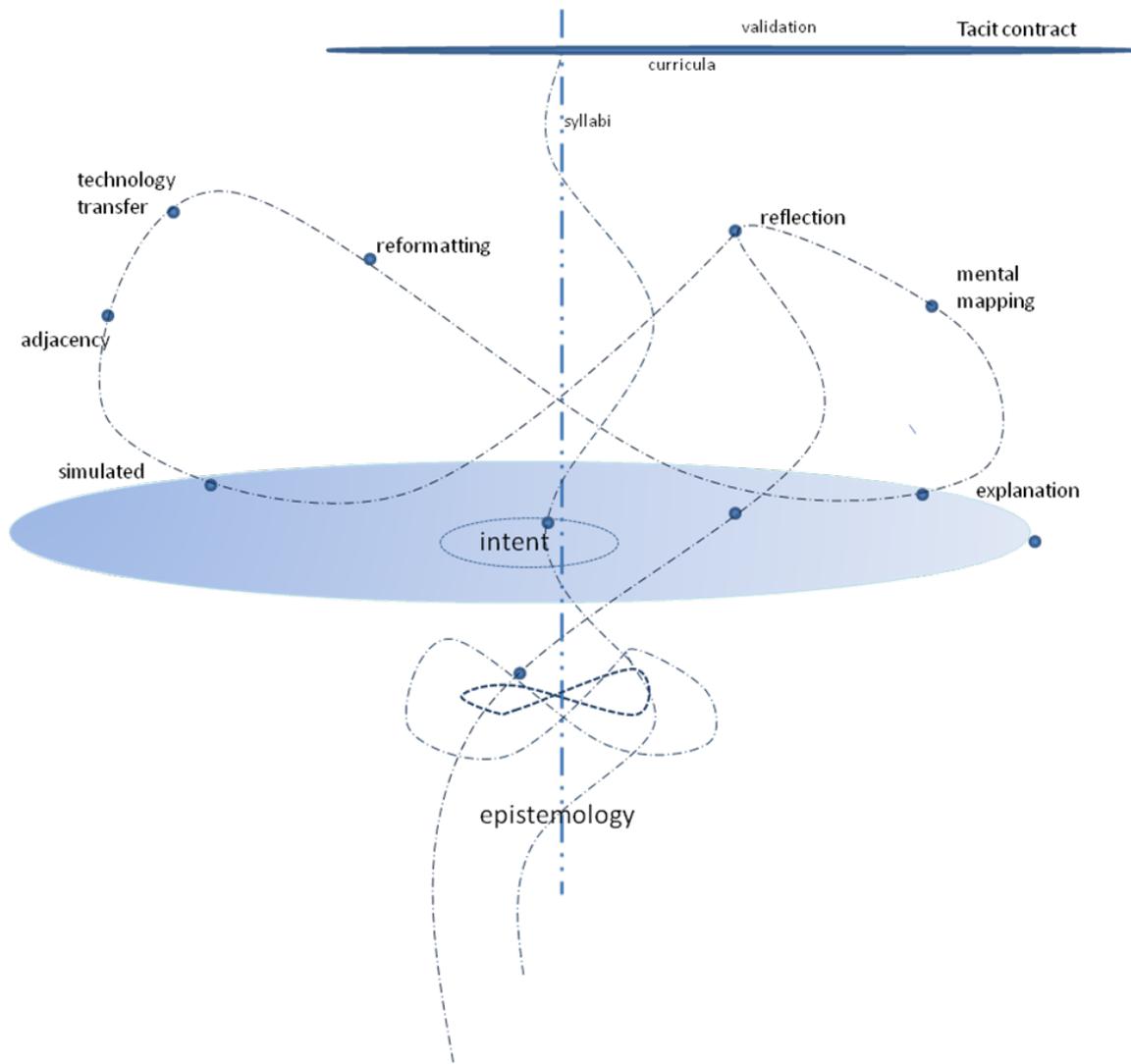


Figure 6-1. Knowledge diagram 03, intuitive process.

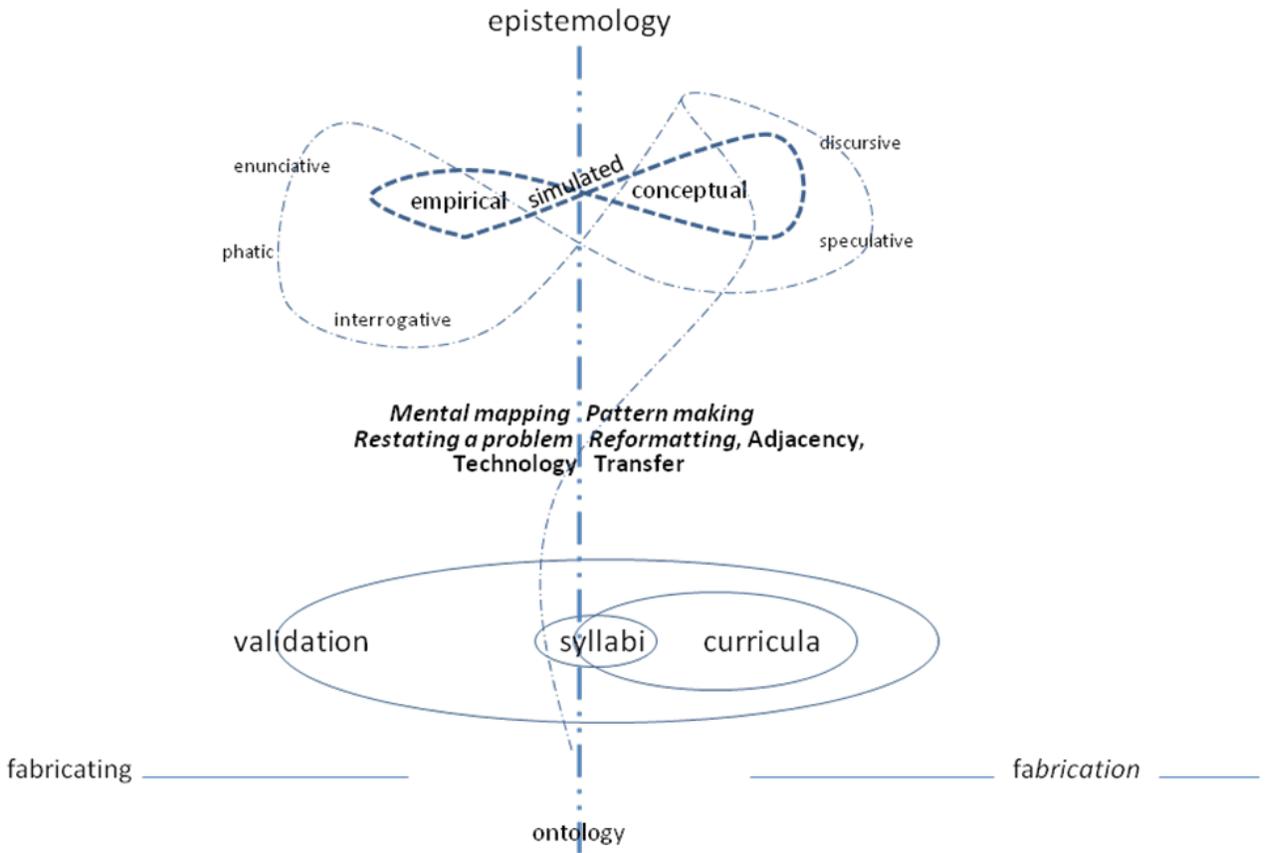


Figure 6-2. Knowledge diagram 02, epistemological system

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