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TEACHING AND LEARNING METHODS: THE SPATIAL GENOME – A SYNCRETISTIC STRATEGY: COMBINING 4MAT AND KOLB CYCLE

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Abstract

This article concerns itself with the 4-celled matrix of the, 4 MAT and Kolb Cycle, very specifically with its experiential domain, which deals with preferences and phobias generated by life experiences. An Equanimeous understanding of such emotions are of vital importance to students for the purpose of eliminating destructive biases that limit their design potential. In order to help students, access such experiences, which often times have been relegated to the unconscious due to their painful nature, this piece have had recourse to Gregory Ulmer's "My story". This is a literary invention that helps trace positive or negative life experiences recurring as themata in an individual's family history, community history, entertainment sphere and career field. An awareness of such themata, which predispose an individual to resort to certain practices to the exclusion of others, is a prerequisite in architectural design since exclusionary approaches tend to deprive designs of their complexity and multifacetedness. Furthermore, architects are the arbiters elegantiae, aesthetic decision makers, for all professions and persons from all walks of life. As such, a sympathetic understanding of the reasons for one's biases or preferences, which is facilitated by the rapprochement of our irrational unconscious with our conscious mind, helps architects design with an open mind and a sense of freedom. In classroom teaching of design theory, teacher superimposed Ulmer's Mystory on the Kolb Cycle's experiential domain, to create a device that helps students get in touch with the experiences of their formative childhood years as a precondition for the understanding of their biases. The creative use of biases as themata in a person's life facilitates the fleshing out of the spatial genome.

Keywords: *Ulmer, Mystory, Kolb Cycle, 4MAT, architecture, teaching*

1 INTRODUCTION AND BACKGROUND VISUALISING SPACE FROM MENTAL SPACE TO BUILT SPACE

The practice of architecture, both as an art form and pedagogy, comes hardwired with a fundamental communicative problem: that of envisioning a yet unbuilt structure as a comprehensive design scheme, in a studio environment (Lucchi, 2023). This is an occupational hazard of sorts, and it has provided the discipline with its rather unique stock-in-trade in the form of production drawings, in which are codified a body of conventions and rules that enable architects to indicate, with absolute precision, the form a completed building would eventually take in its setting. In this sense it resembles music, where a system of notations facilitates the reproduction of an opus conceived in the mind of its creator. Like music, then, architecture is an art form steeped in aesthesis, the oneiric realm of the imagination, but its tangible and quantifiable aspect, a domain that belongs to mathesis, situates it in protean fashion above the great divide that separates the arts from the sciences (Meyer and Norman, 2020).

The architectural oeuvre, evoking intangible emotions through quantifiable earth-bound structure, subsists simultaneously in two worlds and this singular fact makes design a rather complicated affair (Ghosh and Paparas, 2023). Quite simply, between the designer's cup and the builder's lip there exists a shadow land of implicit potentiality. Within this murky terrain, a no-man's land which functions as "an intervening or intermediate agency or substance," the design evolves from concept through precedent studies to final drawings, culminating eventually in the built form (Racionero-Plaza et al., 2020).

2 PRIORITIZING THE DESIGN PARAMETERS

Despite the precision of the architectural drawings and the physical models which are generated during this design process, the built structure that ensues could easily be less or other than what was envisioned through the drawings. This is due to the multiplicity of site and context variables present in a design exercise that could quite easily overwhelm the architect (Wang et al., 2020). Once the designer leaves the site and is ensconced in his studio during the design process, he is more prone through oversight to disregard crucial site/context conditions. These invariably become manifest in the building as faulty design and errors in judgment. Furthermore, constantly responding instinctually to design tends to subvert intentionality: being aware of one's creative intentions from the early stages of the design helps one stay focused on the concept and eliminate the irrelevant. The spatial genome, the subject matter of this paper, is a means of prioritizing design parameters and concretizing them as fragments of relevance. These function very much like the shards of a splintered mirror: the architectural work is intuited, felt as presentiment for the first time via these luminous fragments. In our mind of wonder, these fragments come together and are made whole as in a gestalt as the design evolves. Insofar as the built form corresponds to this gestalt, the designer may consider his efforts as being successful (Tursunovich, 2022).

3 RE-IMAGINING THE CONCEPT

Popcycle, Mystory and the Image of Widescope It was only after my encounter with Gregory Ulmer and his groundbreaking Internet Invention, that author Guneratne began to understand the implications of this spatial genome which author's had first invented for his master's thesis project and subsequently developed for students as a design instructor here at the university (Ulmer et al., 2022). It became apparent to me that what had been trying to do throughout these years was tease out an architectural image of widescope through the agency of an Ulmeresque Mystory. Architects would recognize this image of widescope as the "concept" that generates the design. However, authors feel the word "concept" lacks holistic reverberance, and is therefore too indigent a metaphor to frame the nuanced existential fabric of our built environment. Hence this attempt to expand its frame of reference to encompass an aesthetic and cultural discourse that better reflects the mores, beliefs, myths and natural environment of a people. It is hoped that architectural design would as a result become more responsive, not only to our needs but also to that of the greater domain which includes man and biosphere.

In Internet Invention, Ulmer acknowledges his debt to Gerald Holton, a historian of science, who initially developed the notions of wide image and themata after "submitting the lives of especially creative people to close scrutiny (Holton, 2014)."Holton and other students of creativity discovered through their case studies recurring patterns in the lives of these scientists. "The work of scientific creativity is shaped by clusters of pre-suppositions and 'gut' assumptions which each scientist has about the universe."These gut assumptions are what Holton refers to as themata or themes: these function as inbuilt filters that colour the observations which scientists make, predisposing them towards conducting certain experiments to the exclusion of others. The wide image then is a sort of existential leitmotif that begins to emerge in the lives of gifted people due to these ingrained themata which predispose them towards making certain choices in their work (Holton, 2014).

Ulmer's original contribution to the evolution of the notion of themata lies in his invention of the popcycle. This is a fourfold societal discourse encompassing family, career field, entertainment and community history which is a vehicle for the social and psychological forces by which our identities are constructed. The mystory is a genre that helps gather and juxtapose this fourfold in order to tease out the wide image which is generated as a pattern of correspondences through this synthesis (Saper, 2021). Ulmer's premise here is that one should not have to wait a lifetime for an historian to figure out one's wide image when it could be achieved at the very beginning of one's career. It is the writing of the mystory, then, that has a bearing on the genesis of the concept in the architectural work.

4 EXISTENTIAL SPACE: DIGITAL AND THE ANALOGUE REPRESENTATIONS

Traditionally, and before the computer revolution ushered in virtual reality, design ideas were articulated in studio/atelier settings via annotated architectural drawings (plans, sections, elevations, perspectives, axonometric projections etc.) on paper and through physical models. The former constituted the pre-computer era hypertext

or visualization aids that architects employed to conceptualize buildable form. The virtual world of computer-aided design (CAD), however, opened a window of tremendous opportunity and enhanced the architects' ability to visualize the design scheme in an unprecedented fashion. Unfortunately, the computer interface has tended to block out the natural world and atrophy the non-visual sensibilities of designers, making them insensate to the olfactory, auditory and haptic cues of odours, sounds and textures, stimuli that designers responded to with the utmost sensitivity before the architect's atelier and college studio were computerized. The spatial genome does not turn its back on computer technology, but rather sources it to assemble mentally and somatically derived graphic and verbal constructs into a hypertext that must be responded to with one's entire being. Author would like to stress, however, that this is not intended as a call to arms for a return to a less complicated era before the advent of the computer.

5 THE 4MAT MODEL

Once an architect is commissioned to design a building (or once the student is given the design project at the college level) he must make sense of all the incessantly proliferating variables ranging from the client's program, topography of the site and weather patterns around it to socio-cultural factors such as the mores and belief systems of a region (Aliustaoglui and Tuna, 2022). These are then translated into architectonic cues that help sculpt a functional building, responsive to the cultural and environmental realities that prevail in the locale/region where the building is to be constructed. The sensitive designer also knows how to work with his ingrained personal biases, in a way that would leave his distinct stamp on the building without disturbing the delicate balance between building and context. How then to make sense of this explosion of data? The spatial genome, the solution that I am proposing to this problem, is a device that prioritizes this data and eliminates the irrelevant. It is derived by organizing data within a four-celled matrix that begins to expand concentrically as this data is viewed from multiple standpoints. Known as The 4MAT System, it has evolved into a comprehensive model through the fusion of two learning styles rationales. In 1971, David Kolb, an educator from Case Western Reserve University in Cleveland suggested that "two dialectics of opposites" ranging from concrete to abstract and active to reflective were the major factors responsible for our learning styles. Kolb, by placing each of these polarized dyads at the end of two axes perpendicular to each other created the basic matrix, with the axis connecting each dyad representing a continuum from one state of being to the other (Figure 1)(Rahmah et al., 2022). "By superimposing the results of various composite learning style descriptions on the Kolb model," Bernice McCarthy, "was able to accommodate the major elements of nearly all the other learning styles into a single synthesis." The result was The 4MAT System (Figure 2). This model allows Kolb's two sets of dyads to create combinations that define four quadrants of a learning cycle. Conversely, each quadrant also represents a fundamental tendency that individuals exhibit towards learning and teaching. Thus each individual, in order to attain to a more holistic view of life, would be required to balance the potentialities of all four quadrants. Learning must therefore "encompass the completeness and wholeness represented by a cycle of exploration."4MAT, in this fashion, simultaneously becomes process and existence (Troussas et al., 2021).

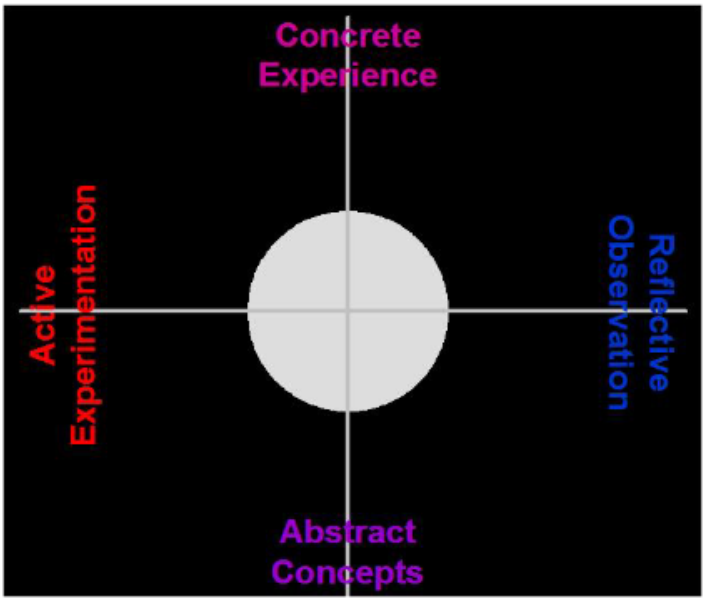

Figure 1: The Kolb Model

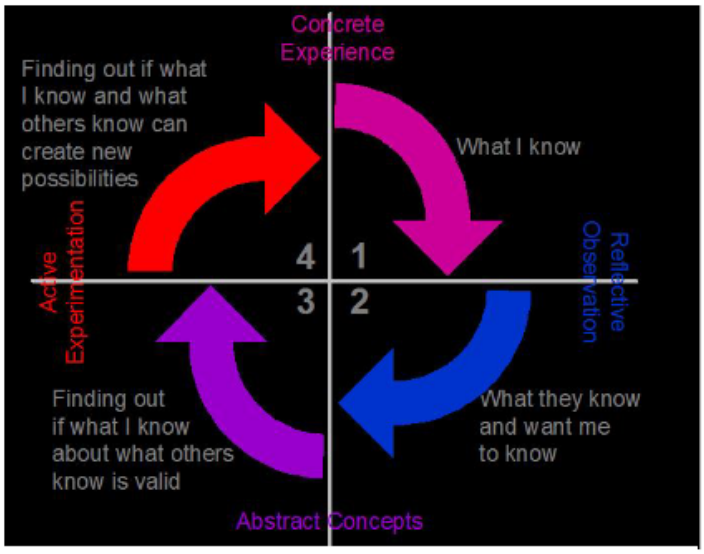

Figure 2: 4MAT and the Design Process

6 THE 4MAT AND DESIGN PROCESS

Considered from the standpoint of process, the four quadrants of the 4MAT model, each with its own pair of descriptors, become representative of the architectural design process. Authors expressed their through the variables Personal, Program, Precedent and Product – or the 4P's – which we inserted as sub-quadrants into the matrix, still qualified by its overarching co-ordinates (Aliustaoglui and Tuna, 2022; Seckel et al., 2022). The architect/student, drawing on his Personal experience of the world he lives in, begins to consider the given Program against the backdrop of pre-existing variables ranging from the topography of the site and weather patterns around it to socio-cultural factors such as the mores and belief systems of the locale/region where the building is to be constructed. Usually the program is for a building type – such as a museum, school, motel, private residence or any other – that is found in our built environment. These constitute the Precedents in the 3rd quadrant of the matrix. In order to ascertain whether certain design features would be feasible for the building being designed, the program along with its attendant variables are tested against a precedent that has already responded successfully to similar environmental and socio-cultural variables. The design builds on the tried and tested features of an existing precedent whilst pushing it in a wholly new direction. Thus the design process moves from analysis towards understanding, in order to bring about change through constant innovation. The result is the final Product, the completed building, which becomes the latest addition to the expanding body of architectural works worldwide. This brings a cycle of exploration to a close and paves the way for the process to start all over again.

7 4MAT AND THE POPCYCLE

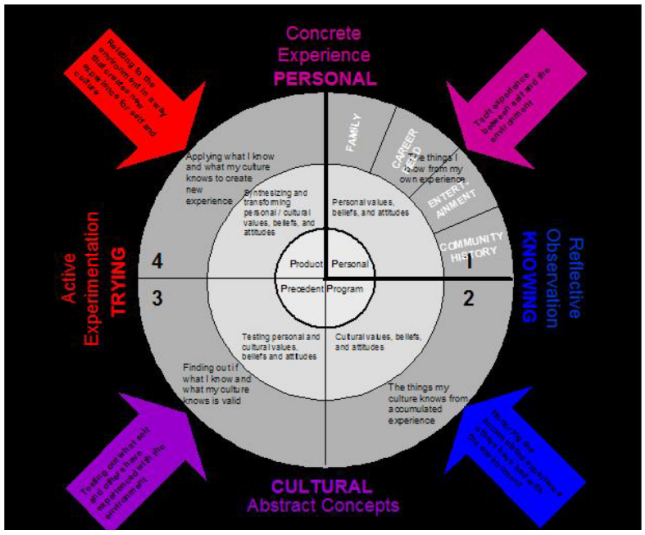

Figure 3: 4MAT with Popcycle

Since quadrants two and three deal with pre-existing systems of knowledge and artifacts, regional cultural discourses and built structures respectively, and since quadrant four addresses the as yet unbuilt final product, the issues of quadrant 1, the subliminal forces that sculpt the individual persona, have to be meticulously exorcised from the designer's unconscious in order for them to have a creative impact on the final product. It is here, then, that Ulmer's popcycle with its fourfold discourse may be put to good use. The Mystory genre helps tease out themata or patterns of correspondences in the life of the designer which, under normal circumstances, would remain dormant beneath our quotidian workday perceptions. Figure 3 illustrates the existential 17 aspect of the 4MAT model with the popcycle integrated within quadrant one.

8 CASE STUDIES: SPATIAL GENOMES

GENOME FOR A FITNESS CENTER

The Mystory, then, primes the architect for the actual design exercise: it is usually a cathartic process resembling a psychiatric couch session where the designer is both analyst and analysand simultaneously. Some of the most luminous explorations of a popcycle that we have come across occurred in the spring of 2022, when authors was conducting a senior undergraduate design studio for students who were on the verge of graduation. They were provided with a site down Kenilworth – at present an empty lot used for parking abutting the bike path – across the road from Beans and Barley in Milwaukee's East Side, for the purpose of designing a fitness center. One of the programmatic requirements was that they connect their scheme by a bridge to an empty lot on the south side of the bike path. Also, since the site was an infill, i.e., wedged between two existing buildings, the scheme could only open on to the bike path and Kenilworth.

The mystory was generated as part of the genome. Its format allowed for a site plan, a pithy exploration of the popcycle and a personalized subtitle for the design reflecting the energy of the wide image, design evolution sketches, precedent studies and images of the final design at the end of the design exercise. Students' skill was evaluated, not on the basis of how many of these components they managed to work into the genome, but on the basis of their ability to transform these components into a luminous wide image that would facilitate the envisioning of the final product.

CASE STUDY I: STUDENT A

This student, who had had a very spiritual upbringing and eschewed "blood sports," was extremely sensitive and envisaged fitness as a state of mind that transcended the physical. His mystory explored the idea of fitness as spiritual strength through transcendence of the earthbound state. Implicit in his solution to the design problem was the notion of pilgrimage and ascent. Thus he conceptualized his fitness center as a grand axial stairway connecting the various floors of the building, yet rising continuously beyond them. His graphic imagery captured the quiescence of a mountain summit at dawn. (Figure 4).

CASE STUDY II: STUDENT B

This student was decidedly concerned with the physicality of things and intellectual pursuits were not her forte. Her design exploration was precipitated by site constraints, i.e., the very apparent lack of space within the hemmed-in site. As a result, her inspiration for the scheme centered round the miniature and her image of wide scope was derived from a metaphor of containment. The wide image she derived for the design of her fitness center was the Japanese Bento Box. Here, the perception of limitation is resolved through the creative apportionment of spaces for the various compartments in the box. This is exactly the way architectural planning exercises are conducted. Her metaphor, in this sense was not a metaphor in the true sense, but a re-imagining of the notion of spatial composition. The image, however, was most innovative and appropriate for the task at hand. (Figure 5).

CASE STUDY III: STUDENT C

The inspiration for Student C was derived mainly from the entertainment discourse in the popcycle. He was obsessed with the idea of pushing the body and mind beyond the normal limits of endurance through feats of derring-do, in order to achieve peace of mind: boxing and rock climbing epitomized his pursuit of excellence. This imagery was translated in his design into the rather forceful thrust of an axial wall that zigzagged through his scheme, morphing into a pedestrian bridge as it passed over the cycle path below. The design, brutally conceived yet elegantly composed, was an oxymoron with optimum usage of the available space. (Figure 6).

Figure 4: Genome –Student A

Figure 5: Genome – Student B

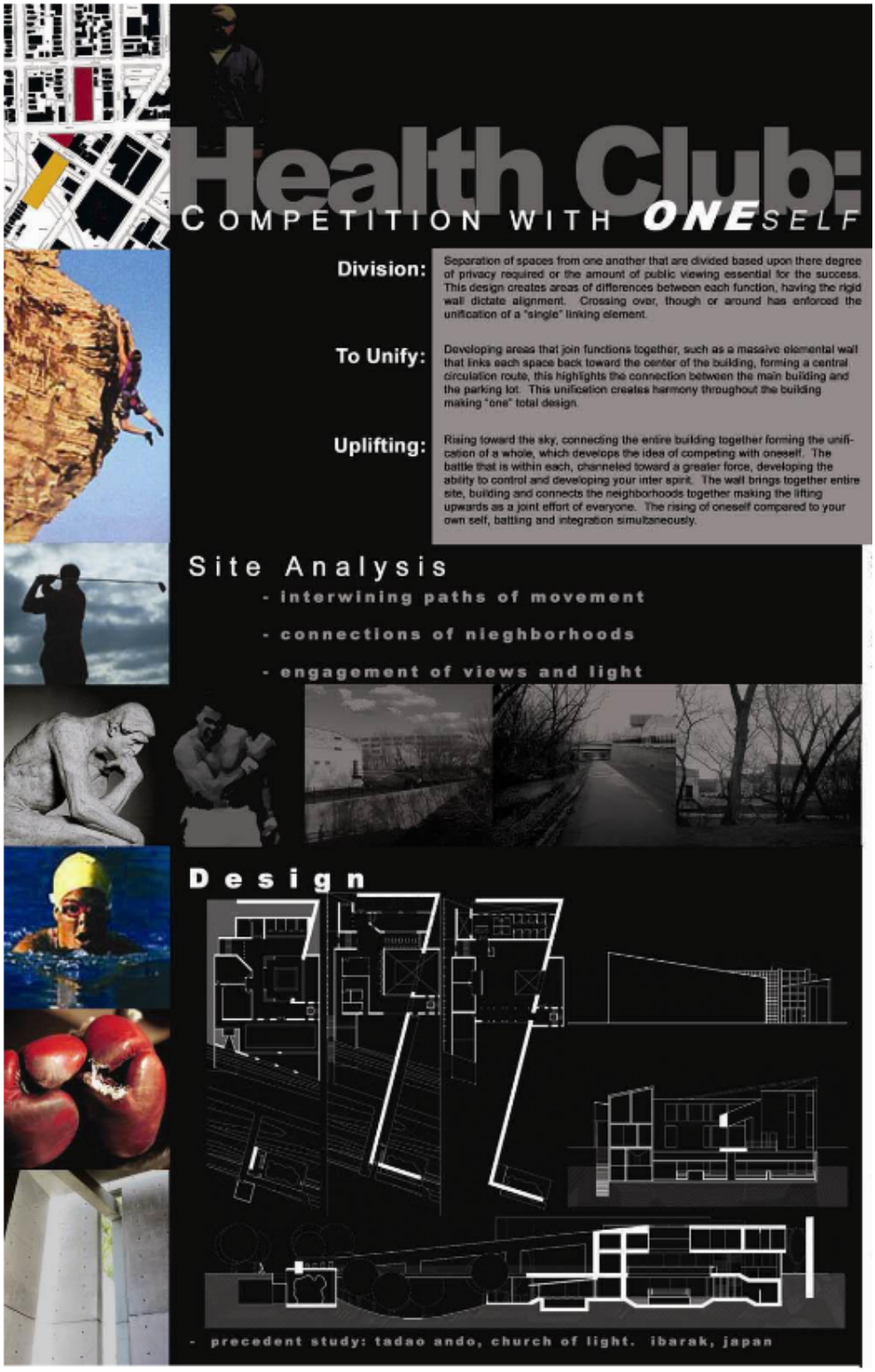

Figure 6: Genome – Student C

9 GENOME FOR AN ENVIRONMENTAL EDUCATION CENTER

Authors would like to bring this paper to a close with an example from my own design portfolio. As a Project Assistant working with Community Design Solutions which is the outreach program of UWM's School of Architecture and Urban Planning, I had the opportunity, this fall, to work onthe design of a nature center. The site for the project was a wooded bluff located in Glacier Hills Park close to Holy Hill near German Town. The place names were too evocative for words, especially the first two, and affected the conceptualization of the design. The undulating terrain of the park carved out by the receding glaciers and the proximity to Holy Hill strengthened the aura of sacrality in and around the site. The client organization, a small but highly motivated group of women,

was interested in replacing the few derelict buildings which functioned as their present Nature Center with an integrated building that would house all the services and exhibition spaces they required.

10 POPCYCLE THEMATA

In my exploration of my own popcycle for design inspiration, one singular pattern of correspondences was clearly discernible: each of the four discourses was connected by a common thread of spirituality and reverence for nature. My family members are lay custodians to an austere sect of forest monks in Sri Lanka, and this inculcated in me a love for the forest and compassion for living things from a very early age. For me, the forest is a benign organism and functions as a sanctuary away from the hubbub of city life. This attitude resulted in a deep interest in wildlife conservation and became an integral part of my entertainment discourse as well. Since my choice of profession was architecture, author drew on nature constantly for his inspiration – sparing a site's spirit of place was sine qua non in all my design projects. Thus my approach to design and site planning, bore the distinct stamp of a spirituality which manifested itself throughout the fourfold discourse of my popcycle.

11 FORMATION OF THE WIDE IMAGE

My spatial genome was defined by the following observation by Gross and Zimmerman: "Interpretive Centers and ancient temples have much in common. They illuminate the spirit of the site. Events, natural phenomena and beliefs combine to create a site's mythology. Myths and legends help us gain spiritual and personal connections to places as diverse as battlefields, historic sites and dramatic scenery." Authors conceptualization for the Environmental Education Center immediately took the form of a vast forest hermitage for all creatures. The nature of the site complemented this attitude.

It is strategically located in the one place within the overall context where a wooded ridge to the west, a grassy knoll to the north, a forested ravine to the south and a gently undulating plateau to the southwest converge. The design concretizes this convergence. The terrain was replete with the composite symbolism of the mountain compounded of summit, plateau, cliff, bluff, slope, ravine, valley and cavern. The mountain archetype emerged from my community history discourse as a center for pilgrimage. In my mind of wonder, the mountain will always remain acred, and this coupled with the site's proximity to Holy Hill, defined the spatial progression of the Nature Center.

In Gunerathne design, the entire Nature Center has become metaphor for the mountain, with a subterranean ramp (in yellow) undulating beneath the bluff and mimicking the flow of contours, leading the visitor down to the entrance at the level of the forested ravine. When visitors enter the Nature Center at this point, its architecture would convey the distinct impression that they are symbolically entering a cavern and not a building. Once inside the building, visitors ascend, as in a vast cavern, two levels to the uppermost level which opens onto a cranberry bog, a Wisconsin phenomenon that seamlessly marries an enduring cultural theme to nature. The centrally located cylindrical structure is the heart of the complex and plays on the concept of water trapped in the caldera of a volcano. It houses an open-to-sky panoramic interactive exhibit which illustrates the nature of biological existence in the elements of earth, water and air. The visitor completes the ascent of the metaphorical mountain, by using an elevator situated at the western end of the building complex and crossing a bridge to the Star Loft, a belvedere located at the summit of the knoll behind the cylindrical space.

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CONCLUSION

The genome for the Nature Center condenses the site's spirit of place and the atmosphere of the scheme into a hypertext that incorporates both computer and freehand graphics. It is an evolving conceptual blueprint and a cognitive map that shows the thought processes of the designer from the inception of the design to the construction stage. It is a useful tool when design becomes a protracted affair and creativity needs to be sustained

over a lengthy period of time. In such instances, it functions as a mnemonic that allows the designer to stay focused on the sources of his inspiration whilst he experiments with fresh insights and design imperatives.

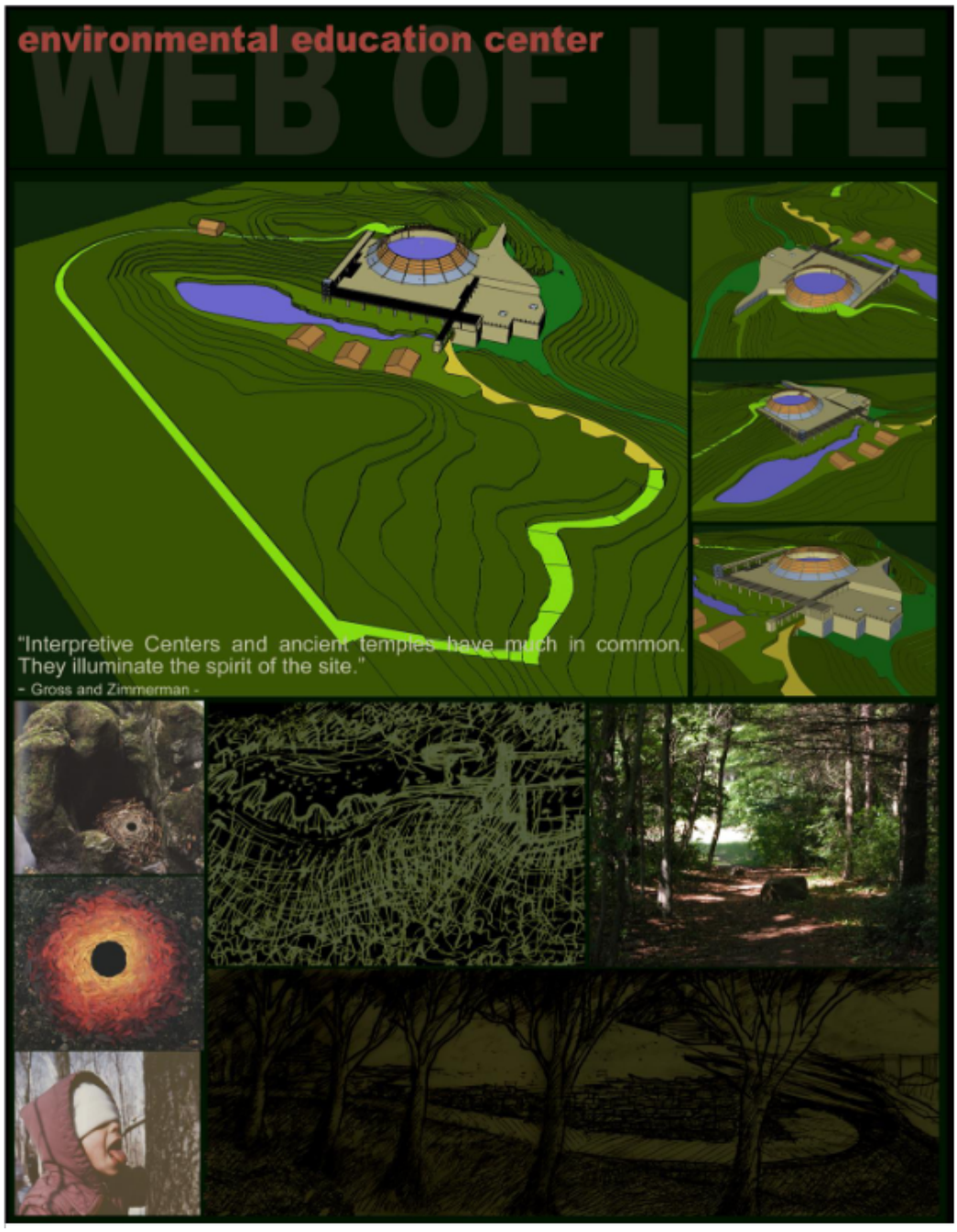

Figure 7: Genome – Nature Center

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