Intelligence-Based Design: Attitudes That Gave Rise to the Present System.

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6.3. The Information Generation.

In recent years, the “information generation” has become more and more reliant on image-based learning, moving students into a near co-dependent relationship with visual forms of information. Exposing students to obscure philosophical writings, dialogue, and discourse only creates in them a greater dependency on images. This practice has allowed architectural academia to de-contextualize architecture even further through the conveyance of images and rhetoric, where endless forms of visual speculation replace what is real. If we are to maintain our humanity, architecture must once again be grounded in an information-rich reality. Physical structures provide our evolved mind with the information content needed to navigate our surroundings, and to manufacture beliefs and values that sustain human existence through culture and community.

Many professional and academic architects believe that the computer modeling which has become so prevalent today, if introduced too early, can effectively ruin a student’s ability to perceive genuine architectural space. Working with small digital images on an abstract digital interface does not allow the brain and hand to learn to synchronize, or couple, in generating a design. As a result, the student never develops the neurological connections so essential to their training. Instead, they grow even more dependent on the superficial manipulation of images. In addition, the software system itself has its own logic, which imposes its own peculiar form of intuition, totally distinct from the human intuition about massing in three dimensions. We recognize these concerns, and solve the problem by grounding a student in feedback techniques from real, physical structures. While we would not go so far as to eliminate computer modeling from the undergraduate curriculum (or even from the first three years), we warn against creating a dependence on artificial techniques at this phase. Digital modeling is a wonderful tool when used to express intuitions solidly developed by physiological means.
Nothing replaces the neurological training and cognitive development that occurs when the human visual system is tied to immediate feedback from physical activities such as drawing. Many firms practicing traditional design first draw all their projects by hand, and only transfer them to a Computer-Aided Design program after they are finished. They have discovered that, otherwise, they lose essential qualities of the design. Alexander (2002) goes further and explains WHY a rough pencil sketch can capture details and essential human qualities. Those qualities are found in the roughness itself, which actually represents an informational complexity that connects with our deeper perceptual and cognitive systems. A rough sketch can show multiple dimensions of a design — most important, its feeling and immediate effect on the user — that should be the goal and essence of the completed building. Such qualities make a user wish to be in such a building. It is very difficult to make more exact working drawings from such a rough sketch without losing the sketch’s positive qualities, yet this skill must be developed. Representing a building’s morphological “warmth” is impossible via computer modeling using existing Computer-Aided Design systems.

Science has demonstrated how the abstract forms of modernist architecture lack the structured information that buildings throughout history have embodied and conveyed. Today, scientists understand more clearly the neurologically-dependent geometries behind structures possessing emergent properties and animate forces. We find that these same general structures are embedded in traditional architectures, but are largely absent from most twentieth-century buildings and cities. This absence of animate forces (architectural life) can be traced to the lack of very precise mathematical qualities in modernist buildings as a whole (Alexander, 2001; Salingaros, 2006). Architectural life is clearly found in the ornamentation and ordered detail of traditional (including early twentieth-century) form languages, which minimalism and brutalism erased.

The emphasis of architectural education on contemporary images tied to electronic media trains students through cognitive feedback processes to produce specifically non-adaptive structures. Students have all but lost their ability to make corporeal value judgments on their own, or to understand how to decipher perceptual and physical stimuli. Architectural training thus, in effect, psychologically conditions future architects to work against their own basic impulses and physiology (Kellert et. al., 2008). Students become co-dependent on image making, which leaves them at the mercy of their professors’ value system. This unbalanced state creates an anxiety in the study and practice of architecture, which manifests itself in design arrogance, an arrogance based on insecurity. Having forgotten how to perceive and judge for themselves what good space is, what good light is, what good materials are, students are left to contend with the designs of the strongest egos. Forgetting how to recognize our innate perceptions — those that instinctively guide us through information content towards what is nourishing to our body and our psyche — allows us to be controlled by the people in power and the dominant paradigm.

Today more than ever, useless information — images, slogans, and memes — saturates our conscious mind. Like white noise, an unintelligible veil disrupts our ability to engage genuinely with useful information when it is presented. Abstract forms in our surroundings (modernist buildings devoid of organized information content) further exacerbate this condition by intensifying or concentrating the barrage of useless
information. This experience is unhealthy. An architectural education adequate to our psychological needs teaches students about the levels and types of information that buildings can present.


Students struggle to make sense of design problems and instructions that purposefully lead them away from reality. Their assignments are couched in the notion that such exploration removes limits or preconceptions that students might place on their design. Students are given abstract paintings, poems, literature, or digital metaphors to guide their work, none of which is related to genuine architectural solutions. In an open-ended question, students are told to proceed without any direct instruction about architecture from their professors. Operating under a mistaken analogy with the heuristic method, professors believe that students must simply begin to produce with as little influence as possible, in the hopes that they might discover something — the so-called “eureka moment” — beyond themselves and their understanding of architecture! This practice goes back to a misunderstanding about similarities between the process of design and heuristic scientific models. Ironically enough, this design process is not directly heuristic in structure or observance: the method presents false positives, triggering the desire for the fashionable image.

Each new supposition, in a series of invented ways to conceive of a new architecture, is supposed to develop from the position of not knowing what that new architecture would be. The initial problem given is most often biased in such a way as to skew the outcome towards an architectural expression that is anything but architecture. Given the unreal nature of these models, real knowledge is cast off, and in its absence, ideology is substituted. Used properly, heuristics requires constraints such as pattern languages. Much can be learned from a process led by evidence-based knowledge; but equally, everything can go wrong if heuristics are misused as the means to a predetermined end. The consistent suppression of pattern languages in Western architectural education set the stage for failure.

Genuinely heuristic exploration is in fact a directed inquiry guided by known principles — freedom is given to explore within a well-defined solution space. People make decisions, come to judgments, and solve problems, typically when facing complex problems with incomplete information. The discovery process occurs because the student finds pieces of information along the way — pieces that the instructor already knows to be there. By contrast, the so-called heuristic method in architecture is little more than the appearance thereof, which presents itself as a case of the blind leading the blind.

Heuristic design directs a search through the space of solutions to a problem. A heuristic method is an exploration based on experience, which can be used as an aid (but not as the only means) to solve design problems. This method uses successive evaluations of trial and error to arrive at a final result. Each intermediate result is tested empirically against reality, thus each attempt at a solution is assessed and used to improve subsequent attempts. The search method follows an iterative process in which information gathered at each step is used to decide on the next step. Solutions are assumed to exist, and the method is supposed to locate an adequate (but not optimal) solution under a given set of
conditions. Any heuristic design method therefore takes place within a solution space that is already defined.

For example, in architectural design, a designer explores the solution space by varying the forms and materials, which can lead to unexpected solutions. This is what happens in the best cases: variation of the parameters expands the loop in solution space so as to catch a solution that had previously escaped. This exploration is made possible by an injection of randomness (corresponding to genetic mutations in Darwinian processes) that generates variants away from the original position in solution space. Of course, deviations from a known solution will most often not lead to any solution at all, and this is where feedback and evaluation become critical. A single, optimal solution usually does not exist in complex problems such as can be solved using heuristic methods.

Genetic algorithms based on Darwinian processes try to mimic evolution and natural selection. These are an application of heuristic design, with selection based upon well-defined fitness and survival criteria. One of the co-authors has written about Darwinian processes in architectural design (Salingaros, 2006). Pattern languages (Alexander et. al., 1977) provide constraints for locating general solutions. Nowadays, the architectural solution space is frequently narrowed by a specific style, and thus the designer is not free to find any adaptive form. This conformity is the opposite of the process of natural selection, where organisms adapt to optimize their chances for survival in a given environment. Despite the expectation of design freedom, selection criteria are not based on fitness, but are instead used to match pre-determined iconic prototypes. Unsurprisingly, therefore, heuristic design in architecture schools leads to the same image-based results.

6.5. Worldwide Architectural Education

We are promoting an educational system that respects and learns from local traditions, and does not blindly copy global styles shown in the glossy magazines. Since the authors are Western-trained, our practical recommendations are meant for teachers and administrators in the U.S. Nevertheless, our arguments try to be universal without being another attempt at globalization. We hope that our model will work for different contexts and will be useful for the reader in any culture. Wellbeing is universal for all cultures, with local factors important but not predominant. Taking into account different realities in different parts of the world, we offer students everywhere a validation of their own culture, even as architectural education has probably turned them against it. We do not suggest a new globalism in the service of localism, but instead a universal understanding of human values, and how they are expressed in different but equally valid architectural traditions.

Central to intelligence-based design is the theory of evolved form languages. Form languages have been developed by different people at different times, and encompass the most important components of a region’s architectural and artistic heritage. A particular form language is infinitely applicable to generate an enormous variety of buildings, each of which embodies particular and unique cultural characteristics. Every form language is also constantly evolving. Intelligence-based design teaches students how to use documented vernacular and historical form languages, not as a dead academic exercise,
but to extend their creativity and the space of solutions for designing contemporary buildings. A form language discourages the superficial “quotation” of design elements outside their grammatical context. Modernist architects never accepted the concept of a form language, and only used isolated words from the language without understanding how every language works according to a deep combinatorial structure.

Our proposals for world architecture are free from any stylistic prejudices. The texts we use respect all architectural traditions that connect human beings with their environment in a positive manner. Many twentieth-century buildings fail in this crucial requirement, and are thus poor models to study. Nevertheless, architecture schools teach the international modernist style and/or its derivatives almost exclusively, proclaiming it the only valid expression for architecture today. This narrow worldview is highly intolerant, disdaining the rich architectural traditions of the world as being “primitive” and “backward” and not worth preserving. In place of those traditions, schools and the media now promote the bizarre work of a handful of Western architects, who are supported by politically powerful commercial and academic interests.

Architectural institutions the world over have unfortunately fallen victim to this indoctrination (promoting a select group of practitioners and a fashionable style), and have turned against their own heritage (Salingaros, 2004). Architects and academics who respect traditional typologies and call for their continued use as viable models are consequently condemned by their colleagues. They are overcome by the academic and economic influence of Western-looking fashion seekers, who have continued to buy into the myth of a superior Western ideology. The problem is that the West doesn’t completely subscribe to this idea either; it is as much a case of supply-and-demand as purpose. If the power brokers can convince others around the world that what they are selling is the latest and the greatest, then they can continue to control the market. In addition, the political machine promises to elevate those that subscribe to its tenets with the same power and influence. Given this reward system, it is easy to find individuals who are willing to copy the latest Western fashions at the expense of genuine culture and heritage. These agents promote the propaganda that adopting fashionable architectural and urban typologies will overcome problems of economic or technological development in any country. People fail to see that the West can offer positive examples of science, technology, and economic models, but fails almost totally in preserving culture and religion.

We are witnessing today what can only be described as a type of cultural imperialism (aesthetic hegemony) in world architecture and urbanism. And while there is a very strong backlash against it, those who recognize the problem are most often unable to do anything about it. One way to stop the damage would be to adopt the principles of architectural education offered by Intelligence-Based Design. This adoption would re-institute an immediate respect of local traditions, culture, and a country’s historical achievements. Most important, the proposals of intelligence-based design are backed by science, and not by any nostalgia for the past or for any particular typology. We believe this to be the strongest argument yet for saving the world’s architectural heritage, and those processes and traditions that create truly great architecture. To date, appeals to the value of this knowledge have not been strong enough to overcome the massive capital consumption and annihilation of cultural entities throughout the world.
References.


