Pattern language studio

Design principles establish the fundamental necessity of design patterns as a human interface with the earth, giving explicit directions for students to begin to engage evolved intelligence in their work. Architecture is practical by its very nature; as such it must not be left to the open-ended pursuit of pure artistic expression, under the guise of a false intellectual premise. Architecture should operate as the foundation for human adaptation to the physical world.

Architecture, as a highly complex system of overlapping geometries and phenomena, extends human consciousness outside our bodies in response to the needs and desires of life. Architecture is thus predicated on the multiplicity of human patterns: how human beings collect, how they live, how they prepare their meals, and what they seek in terms of comfort from the world. Christopher Alexander set about documenting and defining patterns of inhabitance. In his groundbreaking book A Pattern Language (Alexander et al., 1977) Alexander presents the geometries that work to delineate the space that human beings occupy in their everyday events and over their lifetime. From the patterns, students will begin to understand how architecture operates as an extension of human spatio-temporal negotiations with the outside world. Having that knowledge prevents patterns from being dismissed as nostalgic and romantic by those who do not understand their importance.

A design studio based on socio-geometric patterns will establish several projects of increasing scale: for example, a children's playground; a residence for a small family; a restaurant; an airport. Practicalities for implementing the pattern-based method of design are given in the co-author's book (Salingaros, 2005), which explains their combinatoric language. This studio will follow the existing process of design, design review, with a final critique of plans, sections, elevations, and models at the completion of each project. Students should be equipped to deal with basic
design issues, from visual structure to physical engagement. Modifications from the customary studio consist of the addition of full-scale renderings of details, colors, textures, surfaces, and spaces. Whenever possible, at least one portion of each project should be constructed at full scale showing all levels of detail, in order to be able to ascertain its psychological feedback.

Human activities follow certain patterns, which lie at the basis of the complexity of traditional architecture and urbanism. Whereas some designs are specific to culture and location, many are indeed universal. For this reason, documenting successful patterns found in the built environment is a primary step towards achieving adaptive design. Patterns improve the quality of human life, and are not simply someone’s individual preference. They are unrelated to formal architecture (which has shown little interest in this information), and are closely tied to biophilic design. Patterns constrain design, but do not dictate form. A building that satisfies patterns is more flexible and adaptable to other uses later. If students are concerned that using design patterns might restrict design creativity, they have not yet fully understood the process of combining them, creatively and accurately, according to a set of combinatorial rules.

**Heuristic models**

In architectural academia, students struggle to make sense of design problems and instructions that purposefully lead them away from reality. Typically, their assignments are couched in the notion that such exploration removes limits or preconceptions that students might place on their design. They are given abstract paintings, poems, literature, or digital metaphors to guide their design 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 true heuristic method, teachers 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 misunderstood similarities between the process of design, and heuristic scientific models. Ironically enough, the method taught to architecture students (which remains in place later to subconsciously guide design professionals) presents false positives, triggering the desire for the fashionable image. This design process is not directly heuristic either in structure or observance.

True heuristic design directs a search through the space of all possible 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. The method locates one of several optimal solutions under a given set of conditions.

Genuinely heuristic exploration in design is a directed inquiry guided by known principles such as Alexandrine patterns — freedom is given to explore within a broadly-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. Used properly, heuristics require 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 pre-determined end.

In architecture, 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 a controlled injection of randomness (corresponding to genetic mutations in Darwinian processes) that generates variants near 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 for complex problems such as can be solved using heuristic methods.

Genetic algorithms based on Darwinian processes try to mimic evolution and natural selection. These apply heuristic design coupled with selection based upon well-defined fitness and survival criteria. Darwinian processes have already been investigated in architectural design. Pattern languages provide constraints for locating general solutions. Nowadays, however, the architectural solution space is strongly narrowed by a specific style, and thus the designer is not free to find adaptive forms. 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 in contemporary design are not based on fitness, but are instead used to match predetermined iconic prototypes. Unsurprisingly, therefore, heuristic design in architecture schools leads everywhere to the same image-based results.

**Undirected play**

Design is often turned inwards (i.e. disconnected from evidence). Contemporary architectural education intentionally limits the field of enquiry of the design process to a narrow set. In this way, architects deliberately isolate themselves from any explanatory elements of learning, such as design patterns. They avoid content-based connections between ideas and reality. Architecture has generated its own artificial, abstruse, and illogical language. An intentionally isolated approach to form generation results in oversimplified yet meaningless exercises in abstraction. On the other hand, spurious connections are encouraged, based on analogies such as
superficial resemblance. 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.

“Undirected play” is the undying legacy of the Bauhaus, wherein students are supposed to learn architecture through this activity. This is as unrealistic as expecting a child playing with a computer keyboard to come up with a Shakespearean play. More often than not, undirected play is not a learning initiative, but an expediency of not having effective or knowledgeable educators to provide the guidance and structure necessary for students to assimilate their experiences. Under these circumstances, training in architecture schools generates an artificial worldview for the student, based on unnatural images and supported by a near cult-like ideological structure.

Too often, the first years of architectural education today have come to resemble a children’s daycare center, in which four-year-olds are kept busy with mindless play. Undirected play simply keeps children busy until time has come to go home. Surely, this is not what is intended for architecture students today! Not only is the student cut off from other disciplines of learning, but he/she is also isolated from the real world of architectural practice.

During the second part of the twentieth century, creativity has been the principal stated criterion for teaching design. Students challenged to be original have been led to believe that pure creativity depends upon having no preconceptions. That idea is false. Students weren’t told that creativity is possible only when one has general working knowledge and rules to apply to new situations. Problem solving occurs by developing alternative solutions and knowing how to choose from among them. Without definite principles, being told to “create” without precedents, consequence, or understanding, one can only turn to copying that which “appears” to be original — what one sees as originality in the work of designated fashionable architects. But since magazines and critics select from what the elite and powerful vested interests choose to promote on society, the quest for originality becomes little more than mindless conformity.