Built-Environment: Sri Lanka - Vol. 03 Issue 01: 2002

EDITORIAL: Archetypes, patterns & computer applications in architecture

In previous issues, we showcased the breadth of architectural research in Sri Lanka. Four broad areas of research focus were identified under the umbrella of architectural research: Design Methods, Building & Environmental Technology, Environment-Behavior Studies AND History/Conservation Studies. While this journal will continue to showcase some of the best inquiries in these areas, it is our intention to contribute to the dialogue in setting the research agenda for each of the sub-fields of architectural research. We begin this conversation by looking at the "Design Methods" area. Subsequent editorials will deal with each of the other three sub-fields of inquiry.

Design can be construed as a form of scientific research in that, like all scientific research processes, design is essentially about conjecture-making (Hillier, et al, 1984). In making artificial objects (artifacts), design tries to emulate aspects of the natural world and create dependent art (objects whose validity depends on fulfilling a particular function) and independent art (those that are considered valuable in and of themselves).

It is clear that as we enter the twenty-first century, with (or perhaps because of) the tremendous growth in our knowledge base, design methods and processes in various fields are in crisis. It is painfully obvious that design in the dependent arts (like architecture, automobile manufacture, etc.) is in deeper crisis of a philosophical sort. As economies contract to become leaner (and perhaps more efficient, yet ruthless) the question arises as to what good does design do? There are even allegations (particularly among the ecologically-oriented inquirers) that design is essentially destructive!

One need not be gifted with prophetic perception to sense the turmoil architectural design methods in particular are immersed in. While some claim that what is ailing in architectural design is the lack of a coherent theory (or theories), others query the need for a design theory in the first place. Architects seem to have borrowed modes of inquiry from every conceivable knowledge sub-fields (from music to mathematics, computers to literature studies, etc.) without actually creating their own mode.

The crisis is not peculiar to architecture. As Simon (1978) points out many design fields (particularly those that are of a dependent mode) have been affected by the "empiricism" of the sciences and have veered away from design. Thus engineering looks more and more like physics, and medicine like chemistry or biology, and so on. Having been persuaded that a large and more rigorous knowledge base would somehow lead to better designs, the design professions have tended to spend most of their energy in "scientific" justifications of their decisions. Problem-solving in the real world seems to have taken a back seat.

It is in this context that we look at the crisis from an architect's point of view. We attempt to extend the concept of "conjecture-making" (Hillier, et al, 1984) to design processes. We then reflect on the use of computers in conjecture-making.

Simon (1978) distinguishes design from analysis. While he calls the latter the "natural" sciences, the former is termed as "artificial" sciences. In his view, design is essentially "satisficing" a given problem. In other words, design is not necessarily about finding the *optimum* among a given set of alternatives but a *good* or *satisfying* alternative.

This view fits the paradigm of "design-as-conjecture-making." As Simon (1978) says:

> The ability to attain goals depends on building up associations . . . between particular changes in states of the world and particular actions that will . . . bring these changes about. . . Design and design procedures in the real world do not merely assemble problem solutions from components but must search for *appropriate assemblies* (Simon, 1978: 141 – 144, emphasis added).

Of course the conjectures thus made must be truthful to real-world situations, and it is here that a knowledge-based design tool can play a vital role: help in making better and more truthful conjectures. Theories of design and methods or processes should be considered in light of their suitability to making better conjectures. Though we may never know exactly how designers work, this much seems clear: a linear model or process of design does not fit into architectural design processes. Perhaps that is the reason why many practitioners have rejected (pseudo-) rational processes of design. What then must we do?

Christopher Alexander's (1977) patterns are an encouraging start in this direction. Though he does not call them conjectures, the patterns proposed by Alexander are essentially design hypotheses, making explicit the implicit assumptions about aspects of nature and the built environment. It is not that a collection of his patterns would *lead* to design, rather a string of patterns can help in conjuring up an environmental quality that is desired by the designer. Alexander's set of patterns are only a start. Many people, approaching design from different research concerns (like climatically

appropriate design, environment behavior approach, etc.) can enrich the language. Such an enriched set could then become an essential part of all architectural designers. As Alexander himself indicated, a richer language will then lead to better communications among designers as well as between clients and designers.

The availability of tremendous computing power can be harnessed in the service of research on and storage of such a rich set of patterns. Phenomenological reflections on environmental qualities of places can lead to intuitive pattern formations. And these patterns can then be stored in computers where they will also be categorized, arranged in hierarchies and recalled at will. Conversely, patterns may also be developed from successful and well-fitting designs from the past. The research on shape grammars readily comes to mind.

Up to now, computers' role in architectural design has been essentially one of delineation. Increasingly, they are also turning out to be excellent tools for image representation in three dimensions. However, if computers are ever to assist in *designing*, it is within the paradigm of "conjecture-making-and-testing" that hope seems to lie. A flexible and interactive system that is capable of responding from its own library of archetypes and patterns, is not unimaginable. Though such a system is not available as yet, research in shape grammars, patterns, etc., can lead to such a database.

References:

Alexander, C., et al., (1977). *A Pattern Language*, New York: Oxford University Press.

Hillier, B., J. Musgrove & P. O'Sullivan, (1984). "Knowledge and design," in, Cross, N., (ed.), *Developments in Design Methodology*, New York: John Wiley, pp. 145 – 164.

Simon, H.A., (1978). *The Sciences of the Artificial*, 2nd edition, Cambridge, MA.: MIT Press.