A. Design based on intelligence

Information links our lives intimately to the built structures surrounding us, in ways that we are normally not conscious of. Becoming aware of this phenomenon through our own direct experience should lead us to center design on how human beings experience their environment. We ought to design by making every decision while thinking how that affects both the social/human aspects as well as the architectural/tectonic aspects. Continuing to practice detached design — where a building’s form is judged strictly on short-term economy, abstract aesthetic appeal, formal concerns, or on trying to be innovative in a superficial or random way — is simply not intelligent.

The problem facing us is monumental: designing so that every form, space, structure, surface, and detail reinforces the ambient information field in a positive way, helping to connect a user with the building in a healing manner. What are the rules for achieving this? According to the biophilia hypothesis, certain very precise mathematical properties of the environment produce a healing effect. To a large extent, we already know what those are. We can also utilize specific evolved solutions selected over time for their healing qualities. Those proven solutions work because they already embody biophilic mechanisms.

Design adaptation comes from accepting the reality of the system combining building-plus-user into one strongly-interacting whole. We can no longer in good conscience simply impose forms on people, because every form and every space changes the behavior and lives of those who have to experience them. Design assumes a tremendous moral responsibility. An adaptive design method necessarily modifies any abstract form before it is built. When we implement design patterns to make adaptive adjustments, those will inevitably modify the original design, whether it be a glass box, concrete cube, crumpled titanium sheet, etc.

We wish to profit from all prior discoveries in adaptive architecture. A vast amount of experience documents how we interact with the built environment, with different specific geometries, spaces, and surfaces, etc. that improve our wellbeing. Taking the focus off innovative form for its own sake, let us ask what knowledge discovered by others in the past can help us to design a more human environment today. This information is indeed available, although it was neglected because it was
deemed unfashionable. (The ideological impediment to using adaptive design solutions has been shown to be antiquated and invalid, however).

### B. Patterns document healthy design solutions

Design patterns are constraints underlying all evolved design solutions. Generations of people, building by trial-and-error, discovered configurations that made them feel healthy both physiologically and psychologically. The selection of a healthy architectural solution over other possibilities uses feedback to identify a state of increased wellbeing leading to long-term health. This process is the same as genetic programming, where a piece of software is evolved after millions of iterations, with the result continually selected and re-selected because it performs the required task optimally. In the same way, design patterns have been discovered through the evolution of designs, saving us thousands of experiments.

Evolved design solutions lie embedded in traditional architectures. The functional correctness of patterns as design constraints depends both on their widespread occurrence, but also especially on their re-discovery by people isolated from each other — for example, in geographically separated societies. Everything else in those cultures may be totally different, but, since the human body is more-or-less the same all over the world, socio-geometric solutions for a particular design problem ought to obey identical constraints — which they do! The sense of wellbeing experienced from a socio-geometric pattern is shared across distinct times and cultures.

Students typically misunderstand what a design pattern is. They assume that a pattern is simply a repeated implementation. That’s not necessarily a pattern. Many repeating solutions are expedient for some purpose, but do not enhance human life in any way. They are too narrow. A design solution may be widely adopted because it is very cheap, industrially efficient, or because it serves the interests of some group — but it doesn’t enhance the information field. It does not lead to a healthier environment for all users. In many cases, it could degrade the human qualities of the environment; hence repetition alone does not make a pattern.

Most patterns documented by Christopher Alexander in “A Pattern Language” (1977) were derived from looking at solutions that unify the user together with the environment. The main criterion for selection was the healing property experienced when a pattern is successfully applied to constrain a design. The mind-set in which this phenomenon is valid considers human beings interacting with their surroundings strongly enough to affect their health. A pattern is meaningless, however, in a mind-set that treats buildings as detached sculptural objects interacting neither with their users, nor among themselves and their surroundings.

### C. Extracting patterns from observations

An enlightened approach to healthy design chooses to adapt form to discovered patterns that possess the sought-for healing property. We therefore require a
catalogue of patterns for handy reference. How do we document patterns from existing buildings and urban fabric? Extracting patterns from traditional practice is necessary, but rather hard. To observe an isolated pattern clearly implemented in design is rare, for three reasons:

1. The complexity of the best, most humanly-adapted situations is extremely high, because in those cases, multiple design problems are being solved together. Suppose we have identified a setting that has positive effects on the user's wellbeing. There are probably several patterns working together to satisfy a combination of many system dynamics (some of which will not be obvious). A researcher trying to document design patterns has to first disentangle each one from the other. Just as in scientific research, one first detects known previously-identified patterns, and then what is left over contains the new patterns. This discovery process is necessarily sequential, and cannot be achieved all at once.

2. One may discover a set of similar but distinct solutions to a specific design problem, whose common features offer reasonable candidates for a design pattern. Each application shows undeniable healing effects on the user. But which particular constraint is the pattern? It's the one that is most wonderful, that gives the most healing feedback, that makes a user wish to experience its implementation as much as possible. Obviously, this experience is going to be found only rarely. Competing forces of expediency, fashion, short-term economy, or misguided architectural codes and zoning laws are likely to dilute a pattern in many of its applications. Finding a design pattern requires looking for the best possible built example, like a collector searching for the best seashell or antique coin specimen. The archetypal design pattern has to embody the strongest and most positive human effect for that particular circumstance. That way, it can reproduce the same positive effect when built into something new.

3. Patterns represent basic tools for organizing complexity (without erasing it), and are valued by those who study and build complex systems, such as computer scientists. 20th Century professionals tried to drastically simplify the forms of architecture and urbanism, however, with the result that organizational tools no longer held any interest for them. After decades of following a simplifying approach to design, students and practitioners invariably look for non-adaptive simplistic situations rather than exploring complex variants: they are not trained to tackle complexity. At the same time, people have learned to put up with poor or mediocre solutions that are minimally acceptable. To identify any design patterns, one has to break out of this conventional way of thinking.

Despite these difficulties, deriving new patterns is an essential part of innovative adaptive design. A student should first learn to work with the original Pattern Language (Alexander et al., 1977), and then explore other pattern lists compiled afterwards. Finally, they should try their hand at writing innovative patterns for a project at hand. Even though each design problem is necessarily specific, the pattern has to be general. Useful guidelines for pattern writing can be found in the computer science literature, where new patterns are being written all the time.
D. Non-adaptive typologies are not patterns

Simple forms — the opposite of design patterns — are widely used as design prototypes. These represent the most rigid type of design constraint. Our world today is dominated by such non-adaptive typologies, linked to industrial materials, and attached to some ideology. Somebody in the 1920s said that these typologies were "socially liberating", and that they represent "the design of the future", and society repeated them without ever asking whether they work or not. On closer examination free of ideological bias, they fail to achieve whatever marvelous effect was promised for them. Non-adaptive typologies have no healing effect on the user.

The recurrence of neutral and even unhealthy typologies contradicts the process of Darwinian selection historically favoring the healthiest design patterns. Nevertheless, unhealthy design solutions do repeat all over the world because those have been institutionalized. Once specific (non-adaptive) design typologies become established for whatever reason, convention decrees that buildings and cities use those and not any other ones. People will believe unproven promises, and ignore direct physical evidence that contradicts them. Selection of design patterns according to human health and wellbeing can only resume when our priorities shift from preserving an unhealthy status quo, to improving our living environment.

There is no point in trying to teach design patterns to architecture students as long as academia, critics, practice, and the media consider buildings primarily as isolated sculptural objects. And evaluated, moreover, in that peculiar detached 20th-century sense of abstract sculptures. But the new defining paradigm of our technological society is connectivity, not isolation. Contemporary architecture may be confused in its ideas, yet future trends reflect the essential biological and sensory connection between people and their environment.

It comes down to this: the image and the building's form are not primary, but the interactions are. Don't be deceived into limiting the role of the user in your design to pre-selected figurines in software (known as "scalies"), to be placed artistically in several places in your rendering so it looks nicely populated. That's phony. You need to ask instead: “will any person actually want to sit, stand, or walk right there, on that very spot where we see a happy and smiling figure?” This question is the key to predicting actual uses, hence the success of any project. Tools for answering it intelligently need to be re-introduced into architectural education!

What is to be done? Throughout architecture school, a student is given the license to impose forms. Students are misled to believe that they in fact possess an awesome and incredible power to decide exactly how people will use their buildings. They don't, but their instructors teach them a cruel and dangerous fantasy. People will actually use built spaces and paths only because those make them feel comfortable; otherwise they must be forced to do so. Or they will avoid them as hostile environments, a point that is rarely if ever considered prior to construction. Will a design function the way it's naively expected? The answer — yes or no — comes only from the embodied patterns.