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. As we become aware of this phenomenon through our own direct experience, design should be centered 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. On the other hand, continuing to practice detached design — where a building’s form is judged strictly on short-term economy, abstract aesthetic appeal, formal concerns, or on simply trying to be innovative in a random way — is not intelligent.

The problem facing us is monumental: designing so that every form, space, structure, surface, and detail reinforces the information field in a positive way, which in turn will help 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 know what those are. We can also utilize these effects by applying general evolved solutions selected over time for their healing qualities. Those proven solutions work because they already embody biophilic mechanisms.

Design knowledge comes from accepting the reality of the system combining user plus building 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 applies to modify 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 would like to profit from any and all prior discoveries in adaptive architecture. There is a vast amount of experience that documents how we interact with the built environment, with different specific geometries, spaces, and surfaces that improve our wellbeing, etc. Let us take the focus off innovative form for its own sake, to ask what knowledge discovered in the past by others can help us to design a more human environment today. This information is indeed available, although it
was neglected and not used because it was not fashionable. (There is also an ideological impediment to using adaptive design solutions, but the reasoning behind that credo has been shown to be antiquated and invalid).

**B. Patterns document healthy design solutions**

Design patterns are constraints found in 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 task that is required optimally. In the same way, design patterns have been discovered through evolution of designs, saving us thousands of experiments.

Those 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 the culture 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, however, since many repeating solutions are expedient for some purpose, but do not enhance human life in any way. 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, and 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 the unity of 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 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 to discovered patterns that possess the sought-for healing property. 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 situation 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 that were compiled by others afterwards. Finally, they should try their hand at writing new patterns for a project at hand. Even though the design problem is necessarily specific, the pattern has to be general. Useful guidelines for pattern writing can be found in the computer science literature.
D. Non-adaptive typologies are not patterns

Simple forms — not design patterns — are widely used as design prototypes. These represent the most rigid type of design constraint. Most often, they are attached to some ideology. Our world today is dominated by such non-adaptive typologies, linked to industrial materials, much more so than traditional societies were. 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 unhealthy typologies contradicts the basic historical process of Darwinian selection favoring the healthiest design patterns. Nevertheless, unhealthy design solutions do repeat all over the world because those have been institutionalized. Once established for whatever reason, convention decrees that buildings and cities use specific (non-adaptive) design typologies and not any other ones. People will continue to 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, practice, critics, 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. Contemporary architecture is often confused, yet future trends reflect the essential biological and sensory connection between people and their environment.

The image and the building’s form are not primary. Don’t be deceived into limiting the role of the user in your design to a pre-selected figurine in software, to be placed artistically in several places in your rendering so it looks nicely populated. You need to ask: “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 use, hence the success of any project. Tools for answering it intelligently need to be re-introduced into architectural education!

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. But this is 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.