Beyond Codified Comfort: Building Design and Performance
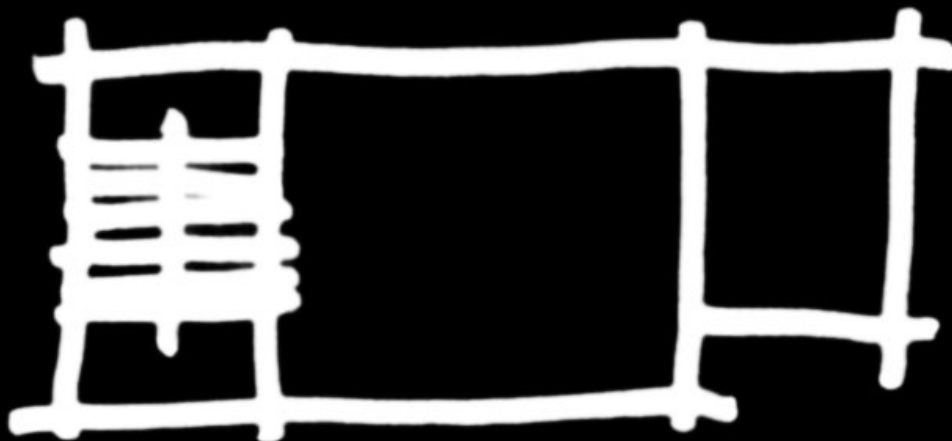
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Figure 1: A conceptual design from the DS9 design studio, University of Tasmania

ABSTRACT

Increasingly, the designed solution to building performance is being replaced by the engineered solution. The reasons for this are **a)** the architectural profession's valuing of the aesthetic over the functional, and **b)** legislation that mandates occupant comfort as defined by a narrow set of numbers.

If architecture is to remain viable as a profession we, as architects, must abandon the notion of architecture as a fashion industry. We must also insist upon our right to *design* buildings that respond to the needs of their occupants, and re-establish the notions of occupant choice and *relative* comfort.

This note takes a critical look at the current notion of architecture as taste making, then proposes a way forward by re-establishing the notion of architecture as shelter building.

Aesthetics and Architecture

Architecture is a profession – the world's second-oldest, according to some. As such, the delivery of architectural services requires a professional approach, and like any other profession this dictates obligations on the part of the professional including expertise, knowledge, skill and rigour.

The practice of architecture also requires objective judgement. A gut feeling, a whim, or a self-motivated aspiration are no basis to decide on whether an appendix ought to be removed, or whether a structure might be adequate to the task. Yet to its disbenefit, architecture is usually described and consumed as a matter of subjective taste.

Few if any buildings are commissioned for a purely aesthetic purpose. How is it then that the work of the architect is understood and often critiqued almost entirely on the basis of aesthetics?

The consumption of architecture is more and more heavily facilitated by imagery. The Water Cube (Beijing National Aquatics Centre) has been widely consumed through voluminous, spectacular, full-colour, high-resolution imagery, and consensus opinion of the Water Cube – good, bad or indifferent – has grown out of a purely aesthetic assessment.

The ubiquity of the Internet, television and glossy magazines that espouse the virtues of style as an expression of status have all resulted in a tendency toward this aesthetic assessment of architecture. This is misplaced. Architecture, I submit, must be assessed primarily on performance – on objective criteria. First and foremost, we build to shelter.

A building must accommodate activity. If we do not start with its function then it is likely that we will start to make aesthetics primary, which will almost certainly compromise the building's performance. An architect may design your neighbour's house employing similar processes to those that were employed for the Water Cube – because it looks cool – though functionally there is no relationship between the two.

And indeed this is where architecture seems to be headed.

Exceedingly few projects place aesthetics as a primary aim, yet the language of architecture and its educational system is increasingly focused on looks. Worse perhaps, our public are the consumers of this rarefied culture, with architects represented as whacky, flash aesthetes. For the public, the implication is that if you want something that works and does not cost a fortune, don't employ an architect.

Coincident with the growing public representation of the architect as aesthete has been the arguably more insidious development of the codified definition of comfort. On the one hand, the consumption of architecture has become singularly image focused, and on the other, the job of the architect, the architect's responsibility, has been wrested from their grasp by an algorithm.

These two apparently unrelated events have conspired to render a dramatic change in the practice of architecture, in the manner in which the work is consumed and undertaken.

Across the domestic architecture market of Australia, there is evidence that where once public buildings of importance would stand out amongst a background of demure yet functional abodes, we now see a mad clamour for visual dominance resulting in an aesthetic cacophony of otherwise boring 'private' – but extroverted – buildings all shouting to be seen.

I am not suggesting that individualism should not be accommodated, but I am suggesting that architects may have inadvertently chosen the battle-front – aesthetics over performance – at the profession's peril. Here we stand, disenfranchised and disempowered; servants to a public who regard us as little more than purveyors of whimsy, and slaves to legislation that forces us *not* to design.

'First and foremost, we build to shelter.'

The public's ocular-centric tendency is being exploited in an attempt to sell stuff. The extent to which this denigrates the profession cannot be overstated. The practice of architecture starts to more closely resemble the fashion industry, notoriously image focused at the expense of any hint of comfort or functionality.

It appears that we have become the 'exterior decorators' of the built environment.

Some of this is our fault. While we concentrated on the building's appearance, we chose to engage an ever-increasing array of consultants to do the grunt work for us. Structural engineers, surveyors, civil engineers, landscape designers, urban planners, quantity surveyors, project managers have all benefited from the abrogation of the architect's professional responsibilities.

The question then is: how can architecture be restored to relevance?

Shelter

A shelter is that which filters or selects out desirable from undesirable attributes in the environment, to varying degrees, under different conditions. The central issue for shelter is the choice between attributes.

It is interesting to watch a dog go from shade, to sun, to shade, to sun...alternately overheating, overcooling... They do not do this because they can't find the spot that would represent the happy medium – they enjoy the sensory feast.

Before we even have a building, we have the ability to *find* comfort. Just about every animal on the planet does this: finds comfort. In our everyday lives we are continually choosing locations that offer us a degree of shelter. We walk in the shade on a hot day; we sit in the sun when it is cold, or shelter under a tree when it rains. A building is shelter but shelter is not necessarily a building. Shelter is where we find it, and it is often found on the edge between two or more states.

It is common for the choices that we exercise in our everyday lives *not* to be primarily about comfort. We will choose to sit outside when it is cold because it is pleasant for some other reason. Our buildings fail us if the only sensory variety they provide is visual.

The legislative path to prescription of comfort has unfortunately robbed us of opportunities for other types of sensory stimuli because, in selecting for non-codified stimuli, we often compromise 'performance' of the codified components.

The codified approach to comfort also denies the designer the ability to design-in difference and to exploit our ability, as the dog does, to *find* what we consider to represent comfort at that singular moment: to change our location in the pursuit of *relative comfort*.

Relative Comfort

Our lives, *sans* buildings, of getting to and from, are defined not by comfort but by degrees of comfort and by relative comfort. It is reasonable to suggest that this is in fact our natural condition.

The escape from our natural condition of continual hunger has lead to problems in health such as obesity. The escape from our natural condition of relative comfort might be responsible for a similar raft of ailments. Indeed, comfort, as defined by codes could equally be described as sensory deprivation. It is important for us to *feel* and it is important for us

to *attain*, even if that is simply to attain a warm spot on a cold day; to achieve a relative degree of comfort. Hence, to achieve relative comfort there is a need for discomfort.

The codified prescription of environmental (comfort) outcomes seems to have been driven by a want to be comfortable without any recognition that discomfort is a part of a natural process, an integral part of the definition of comfort.

Codified Comfort

What we might call excessive comfort is not limited to building; it is a notion that pervades all aspects of our lives, and one that, unfortunately, drives economic growth. 'More comfortable' is a descriptor that could be applied to innumerable elements associated with our everyday lives – a more comfortable car, couch, bed, chair, job, and of course house. The aspiration for 'more' drives us onward, but 'more comfortable' typically means more controlled, more insulated, more isolated.

An isolation from or denial of the world that supports us will always result in bad longer-term outcomes.

Enter the codified prescription of comfort. Our society generally finds comfort in legislation. Having accepted the need to reduce energy consumption we write legislation to achieve it. *Tomes* of legislation. Not only do we write the legislation we set up the organisations, agencies, focus groups, research centres, websites, tools, CPD modules, units, courses, degrees and so on that were required to support that legislation – an economic stimulus package quite possibly unrivalled even by the Building Education Revolution.

Now architects stand passively by while building design becomes a paint-by-numbers exercise of doing what the growing raft of legislation says needs to be done, so that we don't consume so much energy.

Ordnance 70 once stipulated basic requirements of design, essentially to save lives. The rest was up to the designer. No more. It is another nail in the coffin for the architect's professional regard.

It is important to consider where all this is leading. If an architect proposes a dumb, non-functional box that relies on energy input for the attainment of the code-prescribed temperature or energy outcome, then I think they could be accused of failing in their professional responsibility; yet this is precisely the outcome that has been prescribed under the code.

The BCA legislates 'comfort conditions', and on the face of it that seems reasonable – but it is not possible to legislate the choices that people make in terms of occupying space. The fact is that we choose what space to occupy for far more complex reasons than 'absolute comfort', and this complexity is denied by the legislated approach.

Nowhere in the tomes of legislation is there a clause that refers to our ability to move to another room or to dress appropriately. In designing to the codified definition of comfort, I would expect that we would be expending well in excess of 50% of our climatic control energy on *not* moving and *not* dressing appropriately.

If the cost of electricity were to rise overnight by a factor of five I am quite sure that we would see a dramatic drop in demand...*if our buildings would allow this*. But in actual fact, the way that we make buildings would not allow this because we currently operate the building as a single thing, as opposed to a set of things. The code prescribes the antithesis of *difference*.

The effect of the code is to deprive occupants of sensory stimulus and the ability to seek comfort. It denies the outdoors as part of the designed response, and it prevents the effective coupling of energy conservation measures with power cost increases. Finally, it prevents architects from offering designed solutions for building performance.

By all means, let the legislators legislate – but let designers design!

Art and Science

Opinion on the nature of architectural endeavour has long been split; art or science? I must confess a considered opinion that it is a science, but I feel compelled to acknowledge that it is a science that requires the application of synthesis; it is a science that requires art.

Some view the application of art in architecture as an aesthetic overlay, but I would suggest that art and science are simply two different modes of thinking; synthesis and analysis respectively.

The problem for the practice of architecture is that an area of professional expertise that requires an approach of 'synthesis' has been undermined by the law's privileging of quantifiable data. The law requires that we prove, using science.

But human comfort is an extraordinarily complicated condition. We individually and continually judge and assess 'comfort' based on an enormously wide array of variables and we are more than happy to trade one off against others. We also define our comfort relatively. Essentially, the variables involved in the definition of comfort are non-quantifiable.

Despite this, the model that is employed to determine comfort makes reference only to instantaneous sensible temperature conditions; relative conditions are not considered.

Ole Fanger's climate chamber experiments of the 1960s set the stage for this approach to defining comfort. Although on the face of it definitive, Fanger himself advised judicious use of the findings (see EDG 69 CC). Sadly, the legislators were not listening.

The fact that comfort is relative is what enables the dog to achieve continual, even continuous comfort by moving, from time to time, from one place of excess heat, to another, of excess cool, and enjoy doing so. However the 'scientific' definition of comfort denies us the same enjoyment.

A Synthesised Solution

How then can we devise an assessable system of dynamic comfort, an oscillating approximation to comfort that reconciles art and science?

At the University of Tasmania, School of Architecture and Design, a fifth year design studio, DS9, explores the notion of difference.

The value of difference is considered through an extraordinarily simplified mechanism – choice based on a very limited options set, and by always defining an alternative. The fundamental premise in DS9 is difference, and the choices that emerge through *difference*.

Subjectivity vs. Objectivity

OBJECTIVE	SUBJECTIVE
Performance	Appearance
Need	Desire
Cost	Value
Left brain	Right brain
Science	Art
Fact	Feeling

When I work with new recruits, I always try to give them the chance to design, and to present their design to a client. I let them make the mistake of presenting their design based on its appearance - they all do. The chances of the employee's aesthetic tastes matching those of the client are very nearly zero. The new recruit invariably returns with their tail between their legs: 'They didn't like it'. But when did the issue ever become one of making the client *like* something? Do we work to satisfy our own egos, to make others comply with our aesthetic tastes? The point of architecture, or any professional endeavour for that matter, is to solve our client's problems for them – and our clients rarely have a problem deciding what they do or do not like.

The alternative 'sales pitch' is to clearly articulate how a design has solved identified problems: that is, to be objective.

Let's say we need a high-performance, operable window. We specify a 'full-height louvre window'. But what if our client doesn't like the look of the window? We are left to either compromise the building's performance or to stamp our feet and insist. Alternatively, if we have agreed beforehand on the objective performance criteria, we can state that whichever window system we choose it must:

- Offer a large opening area (preferably 95%)

- Control the breeze so that the windows do not have to be shut when it is very windy

- Allow windows to be kept open even when it is raining without wetting the interior, because it is still hot when it is raining

Objective performance criteria can easily be agreed upon. And crucially, now we have a choice. If the client doesn't like your preferred window's appearance you can look at other performance solutions. If you are adept, they too will meet your aesthetic aspirations – and the design process will not have failed due to what are almost guaranteed differences of taste.

Having decided upon this objective approach to design, we are at liberty to debate aesthetic differences of opinion without compromising the outcome. We are able to acknowledge that we each have different tastes, but to agree that things must 'work'.

Geometry and Disposition

Architects have tool sets – mechanisms by which we are able to solve problems – and the primary tool set is Geometry and Disposition; the geometric relationship of the parts that form the whole. Geometric relationships are employed by architects to resolve a very wide array of typical design problems: program, price, performance and so on. These are the most basic tools of the architectural trade: we 'place'.

Much of the lecture material in DS9 is about thinking processes, about the relationships and differences between science and art, about objective assessment and subjective assessment. It attempts to give students an understanding of the differences and, as such, an ability to discern when each ought to be, or is being applied. If architects are going to provide professional services that are essentially about solving problems, then we need this background. Students are shown how to think, not what to think.

Sameness vs. Difference

The design studio explores the nature of difference by first considering sameness.

The 'plan' below represents a planning option that is characterised by sameness. Oddly enough it also represents a planning option that closely resembles the model imposed by 'the algorithm'.

There are no effective translations that can be made to this geometric 'solution' that will result in any meaningful performance differences. By comparison, the rectangle below offers an opportunity – because it offers difference.
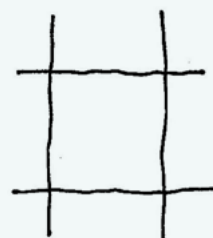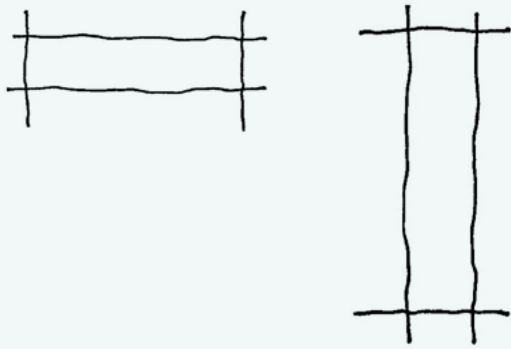
Simple rotation produces a different performance outcome. For example heat gain might be affected by increasing orientation to the north.

By taking these two base diagrams and adding another parameter it is easy to see the extent to which the solution set quickly expands. A four-square plan – that is, a divided space – despite a great deal of similarity to the original square arrangement, suddenly presents a significant degree of difference, if considered from a thermal performance perspective.
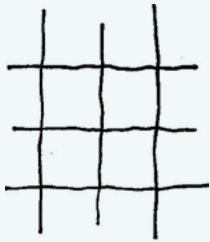
The position of the sun at different times of day will elicit different responses from the various spaces within. Given this fact, it is an absolute certainty that, from any individual's perspective, one space will be more comfortable than the others.
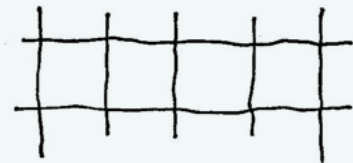
The very same logic can be applied to the compartmentalised rectangle, but we can also see that as a crude form, the square, which offered so little in terms of difference, now appears to offer significantly more merit than the compartmentalised rectangle, because there is more difference in the orientation of the individual parts. Difference is critical to performance.

The next step is to consider how material differences might be arrayed to incite even greater diversity in the outcome. We might consider the heavy line to represent resistive, the thinner line might represent responsive, each exploiting or resisting, as the case may be, different climatic influences – but their geometric characteristics and mutual dispositions are what offer the real opportunities
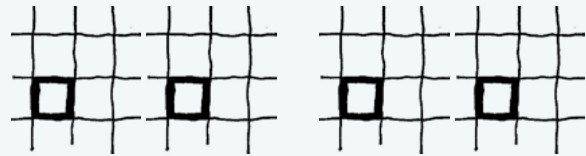
A material difference in one quadrant will achieve the desired result. That difference may be thermal mass, insulation, solidity, openness, etc, and in the case of the square, the difference can be applied to any quarter, depending on the desired performance effect. Difference, however, is the key.

The compartmentalised rectangle too can be considered in this fashion, however in this case slightly more complex assessment is required.
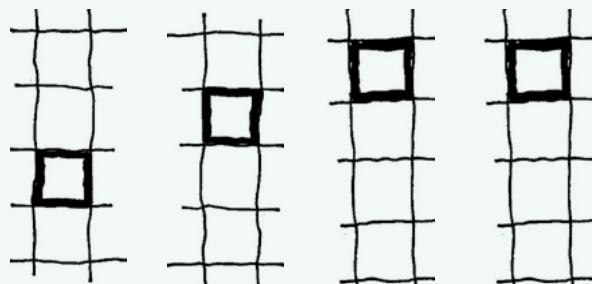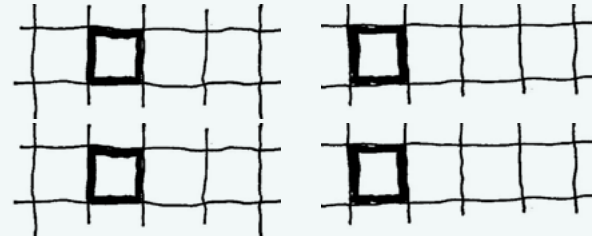
The degree of difference, and the details of the differences, comes down to the skill of the designer.

Disposition and Geometry are the means by which performance is improved, by which choice is offered. Without recourse to technological inputs, without energy expenditures, this sort of redistribution will produce shelter if thought through.

Basic geometry and disposition of component parts forms the basis for an expanding set of solutions that each offers identifiable performance difference. The exploration continues through degrees of complexity that reveal a staggering array of different performance outcomes through the most basic translational procedures. In every case, difference is the goal.

Broader characteristics such as surface area to volume ratios will come into consideration. These broader characteristics will be common to climatic zones – geometric patterns will emerge that make sense under different imposed climatic conditions. In the tropics, long, thin plans work, but in other climate zones they may result in adverse effects (for example, excessive heat loss at night).
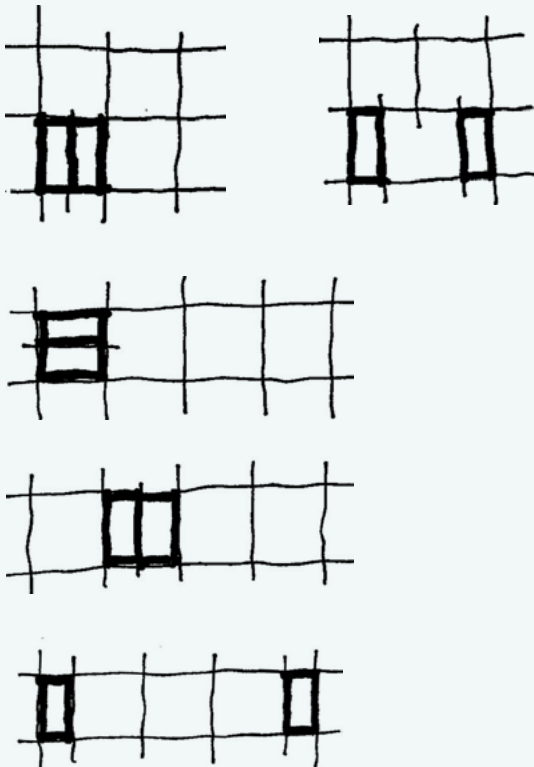
DS9 is an exercise in exploring an alternative approach to the codification of comfort. The exercise is designed to encourage students to apply logic, knowledge and understanding *but not science* to the problem of shelter.

The basic distributional arrangement will certainly result in specific performance characteristics, and these absurdly simple diagrams help us to understand the appropriate patterns.

Aesthetics do not form part of this consideration. We are aiming to provide shelter. That said, we are not claiming to have achieved the codified definition of comfort. Far from it. In fact the process explores the means by which *excess*, in terms of attained internal conditions, as opposed to mediocrity might be developed.

The conclusion we draw from this exercise is that with a minimal materials palette a very broad range of indoor environment conditions can be generated. Given a basic materials palette, each of us could almost certainly find a comfortable space in even harsh environmental conditions in one of these arrangements. The generation of difference is what enables this.

The caveat is that we would be required to find comfort, in the same way that the dog does. However my belief is that this is a worthy goal, significantly more worthy than the current goal of comfort in stasis.

Conclusion

Even cursory consideration of the above brings one to the conclusion that to design in a degree of excess is a sensible approach. Not only would this approach enable those of us who crave what some would consider excessive heat, or suffer without substantial cool, to satisfy our own personal comfort goal, but the approach comes with the added advantage of always having access to the other. Whether due to some short-lived aberrant climatic trend, to personal clothing preferences, health issues or any number of other conditions, we are able to exploit what has been held in reserve – more cool or more heat.

Our manipulation of the disposition and interrelationships of materials and component parts of buildings can produce an extraordinarily wide range of performance outcomes from a very limited tool set. This is in fact what has enabled us to 'shelter' for millennia.

One of the wonderful things about designing for difference and understanding that it is in fact the extremes that we want, is that we can include outdoor spaces in the solution set. The advantages of doing so cannot be underestimated, and the very fact provides evidence of the extraordinary value of the proposition.[1]

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1   Against this, legislated provisions that purport to encourage 'design for climate' can now be seen for what they are: design against climate.

Further Reading

EDG 69 CC, 'Adaptive Comfort: Passive Design for Active Occupants' by Christhina Candido

EDG 67 CM, 'The Climate-Adaptive Vernacular Architecture of Asia-Pacific' by Carol Marra

EDG 67 AH, 'Designing User-Friendly Passive Buildings' by Ania Hampton

About the Author

Geoff Clark commenced work with Troppo Architects in 1994 and worked for 13 years in Townsville on projects of all types across the state. He is now a Senior Lecturer in Design and Building Technology at the University of Tasmania's School of Architecture and Design, and 'trying really, really hard to make a difference'.

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