CLIENT: Architecture Department - University of Pretoria

PROJECT DESCRIPTION: Alterations and additions to existing Boukunde building to facilitate an extension of workspace (studios, labs, open plan office), as well as formal exhibition space. Investigate opportunities for integration of modern services technology to reduce energy consumption, make better use of available resources and liberate the buildings space plan for current and future expansion prospects. Analyse existing building envelope daylighting and thermal performance - with practicable retrofit interventions to improve where necessary.

SPATIAL QUOTAS:

CURRENT	STUDIO/LAB SPACE	EXHIBITION SPACE (formal)	EXHIBITION SPACE (informal)
Basement	$0m^2$	$0m^2$	$210m^2$ (amphitheatre + basement store)
Ground floor	$660m^2$	$172m^2$	$60m^2$ (passage ways)
1st floor	$700m^2$	$150m^2$	$110m^2$ (passage ways)
2nd floor	$700m^2$	$0m^2$	$800m^2$ (1st year studio + passage ways)

With a projected 30% increase in student numbers, a general assumption can be made in respect of required floor area increase. A minimum 30% increase in formal work- and exhibition space would theoretically be required to service the departments short term requirements.

Additionally, space will be set aside for the exploitation of commercial potential. Amongst the Universities stated goals - listed in the Strategic Plan 2007-2011 (www.up.ac.za) - is the generation of funds via private initiatives. One such proposed initiative is for a printing facility to be set up, which would include the capacity to provide specialised services such as 3-dimensional printing. Such prototype modelling systems would be useful for the Architecture Department itself, as well as many other faculties or commercial entities who deal with the design and production of solid objects. Thus, a function that is directly relevant to the Departments activities could be leveraged for the financial benefit of the University itself.

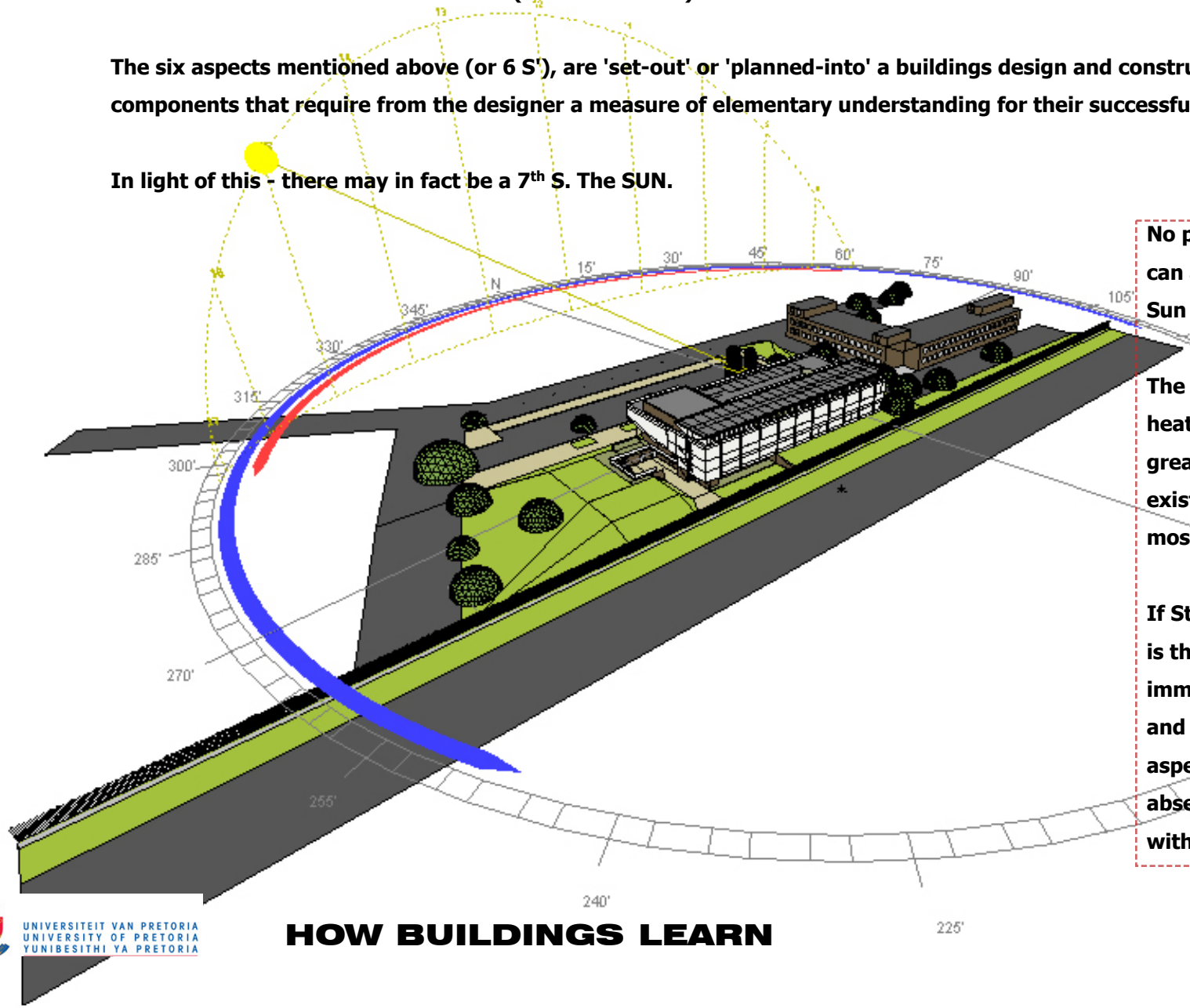
"For a building, driving forces might include changes in technology, in the neighbourhood, in the economy, and in tenant use. The [planning] group ranks these driving forces in terms of importance and uncertainty, placing the most important and most uncertain highest, because it is the most important uncertainties that will drive the scenarios apart." (Brand. 1994:182)

theory

In his book "How buildings learn: what happens after they're built", Stewart Brand describes a list of Shearing Layers comprising (in order of temporal robustness) SITE, STRUCTURE, SKIN, SERVICES, SPACE PLAN, and STUFF. "This Time-layered perspective is fundamental to understanding how buildings actually behave." "Likewise the construction sequence is strictly in order: Site preparation, then foundation and framing the Structure, followed by Skin to keep out the weather, installation of Services, and finally Space plan. Then the tenants truck in their Stuff." (Brand. 1994:17)

The six aspects mentioned above (or 6 S'), are 'set-out' or 'planned-into' a buildings design and construction. They are parts of a whole - components that require from the designer a measure of elementary understanding for their successful integration into a bigger picture.

In light of this - there may in fact be a 7th S. The SUN.



No project in the built environment can afford to ignore the impact of the Sun on the other 6 S'.

The Sun is the provider of life, light, heat, energy and fuel - which, to greater or lesser extents - facilitate the existence of human-kind, as well as most other forms of life on this planet.

If Stuff is the most transient, and Site is the most persistent - then Sun is the immovable, unwaivering, unforgiving and obstinate of the 7 S'. It is also the aspect that is most conspicuous by it's absence- or overbearing presence within our buildings.

"The diameter of the Sun is about 1.4 million km, 109 times that of the Earth."

"Its volume is big enough to hold over 1 million Earths."

"Temperature in the centre of the Sun = 1.5 million°C."

"The Sun converts 600 million tons of hydrogen into 596 million tons of helium every second - the extra 4 million tons is converted into energy in the form of gamma rays."

"You can imagine the enormity of the energy generated when you realise that, given Albert Einstein's $E=MC^2$, the 4 million ton differential is multiplied by the speed of light.....squared."

"The Sun gives off 6200 watts of light from every square centimetre of its surface."

"The average distance from the Earth to the Sun is 150 million kilometres, which takes sunlight around 8.5 minutes to travel."

(www.naturalfrequency.com)

In an age where mankind is having to explore alternate conduits for the sun's energy by way of necessity - it has brought the 7th S into sharper focus. We are looking skyward to secure our resource future, and whilst market forces are more than likely the primary drivers of this awakening, solar profits are in fact available to everyone.

This is not revolutionary thinking by any stretch of an imaginative mind, but the penny truly drops when the cost of artificially maintaining comfort levels within our buildings becomes virtually unsustainable.

"Dewey pointed out that learning takes place by doing, and refers to two aspects: continuity, where a student would connect new knowledge with previous experience, and interaction, where the student will be actively involved in learning in her/his environment. Individuals construct their own meaning through reflecting on their interaction with their surroundings." (Constandius. 2006:2)

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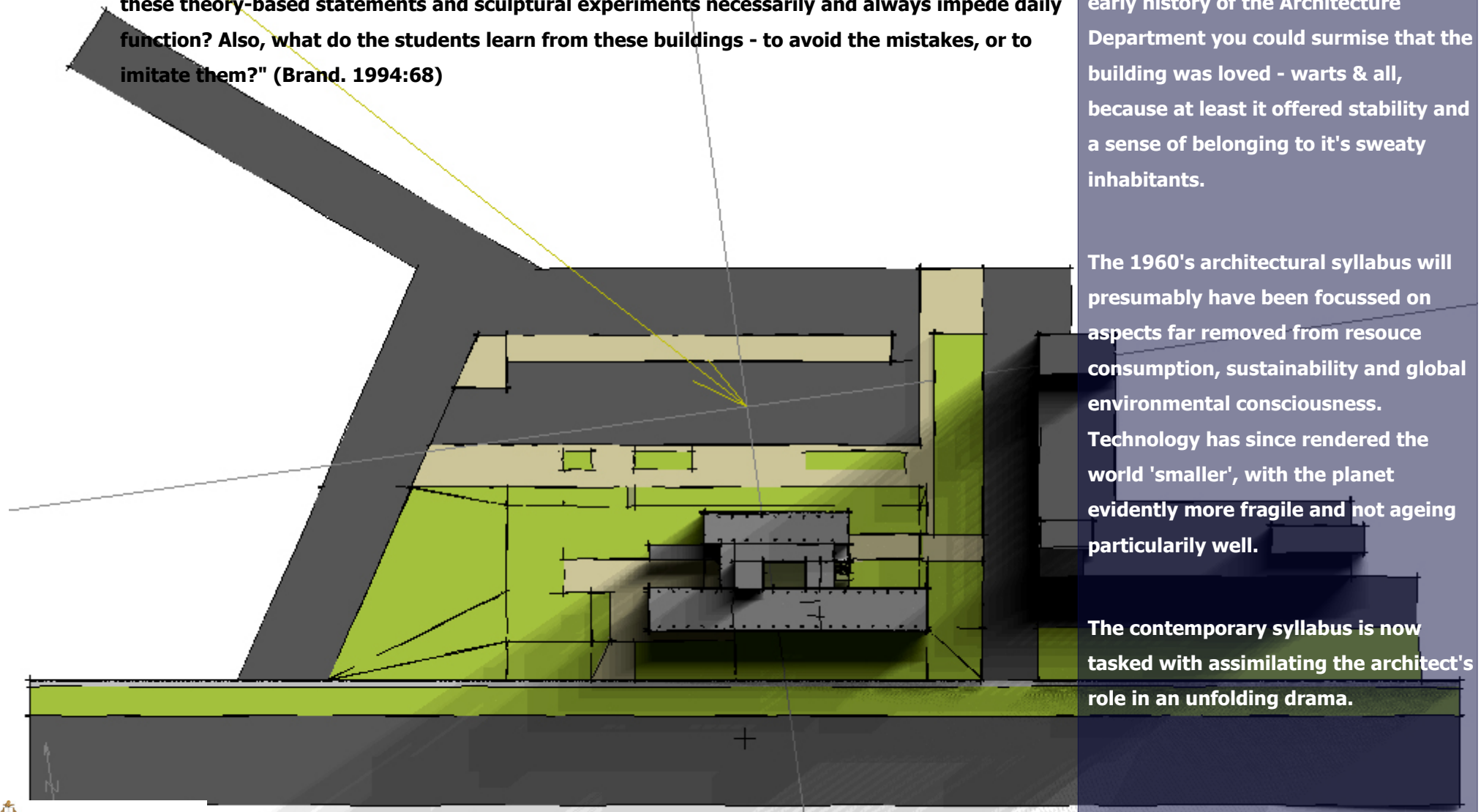
didactic value

"A cruel but pointed project would be a systematic study of the failings of the buildings that house university architecture departments. Invariably designed and built with great fanfare, as a class they are perhaps the most loathed of all academic buildings. From Paul Rudolphs infamously brutalist Art and Architecture Building at Yale to the harsh Wurster Hall at Berkeley, the buildings are exciting and unworkable. Are they unworkable because they are exciting? Do these theory-based statements and sculptural experiments necessarily and always impede daily function? Also, what do the students learn from these buildings - to avoid the mistakes, or to imitate them?" (Brand. 1994:68)

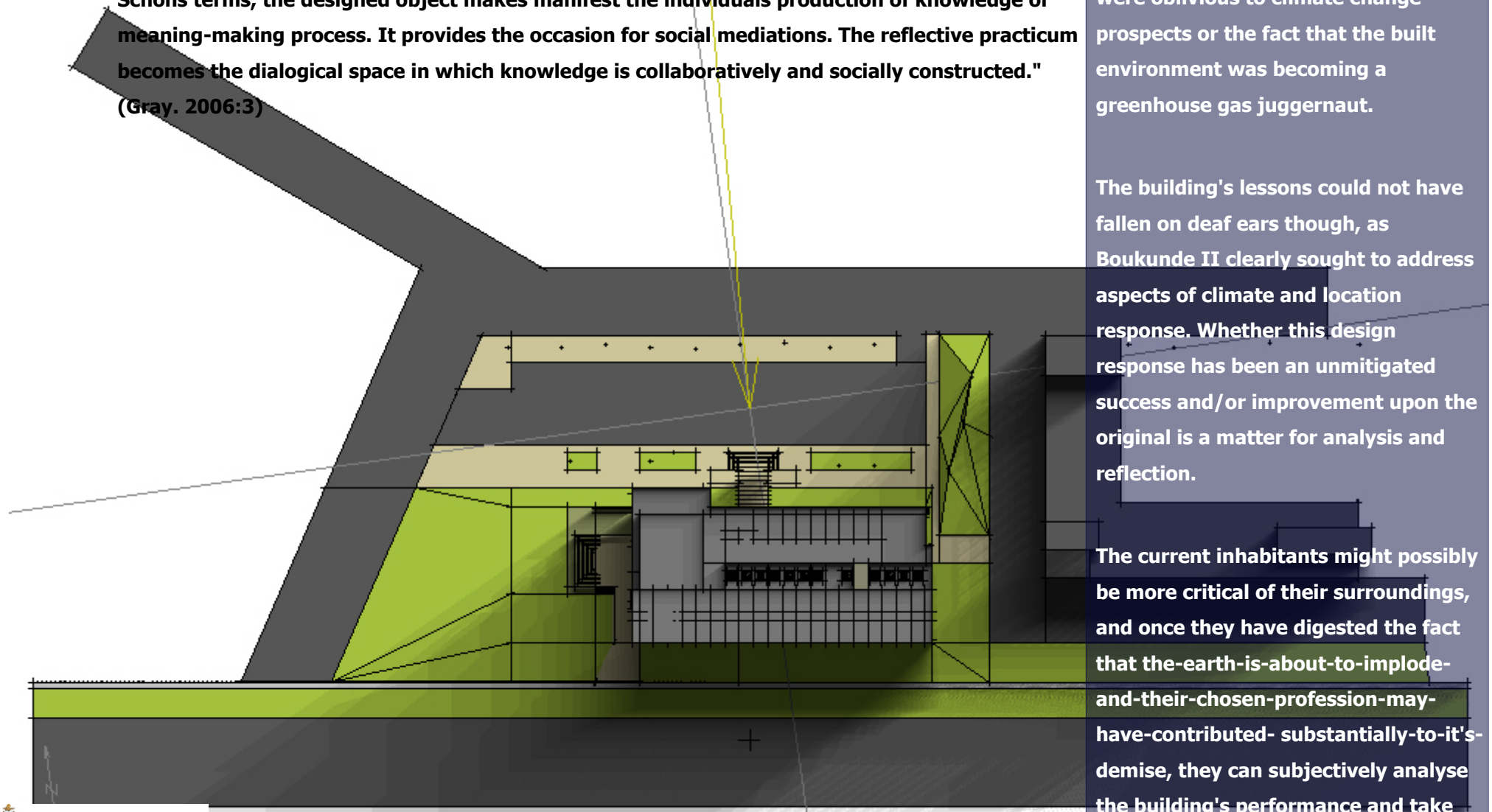


Boukunde I was essentially a 'glass box' that adopted no obvious measures to protect itself against the elements - most notably the harsh summer sky. Based upon the tortured early history of the Architecture Department you could surmise that the building was loved - warts & all, because at least it offered stability and a sense of belonging to it's sweaty inhabitants.

The 1960's architectural syllabus will presumably have been focussed on aspects far removed from resouce consumption, sustainability and global environmental consciousness. Technology has since rendered the world 'smaller', with the planet evidently more fragile and not ageing particularily well.

The contemporary syllabus is now tasked with assimilating the architect's role in an unfolding drama.

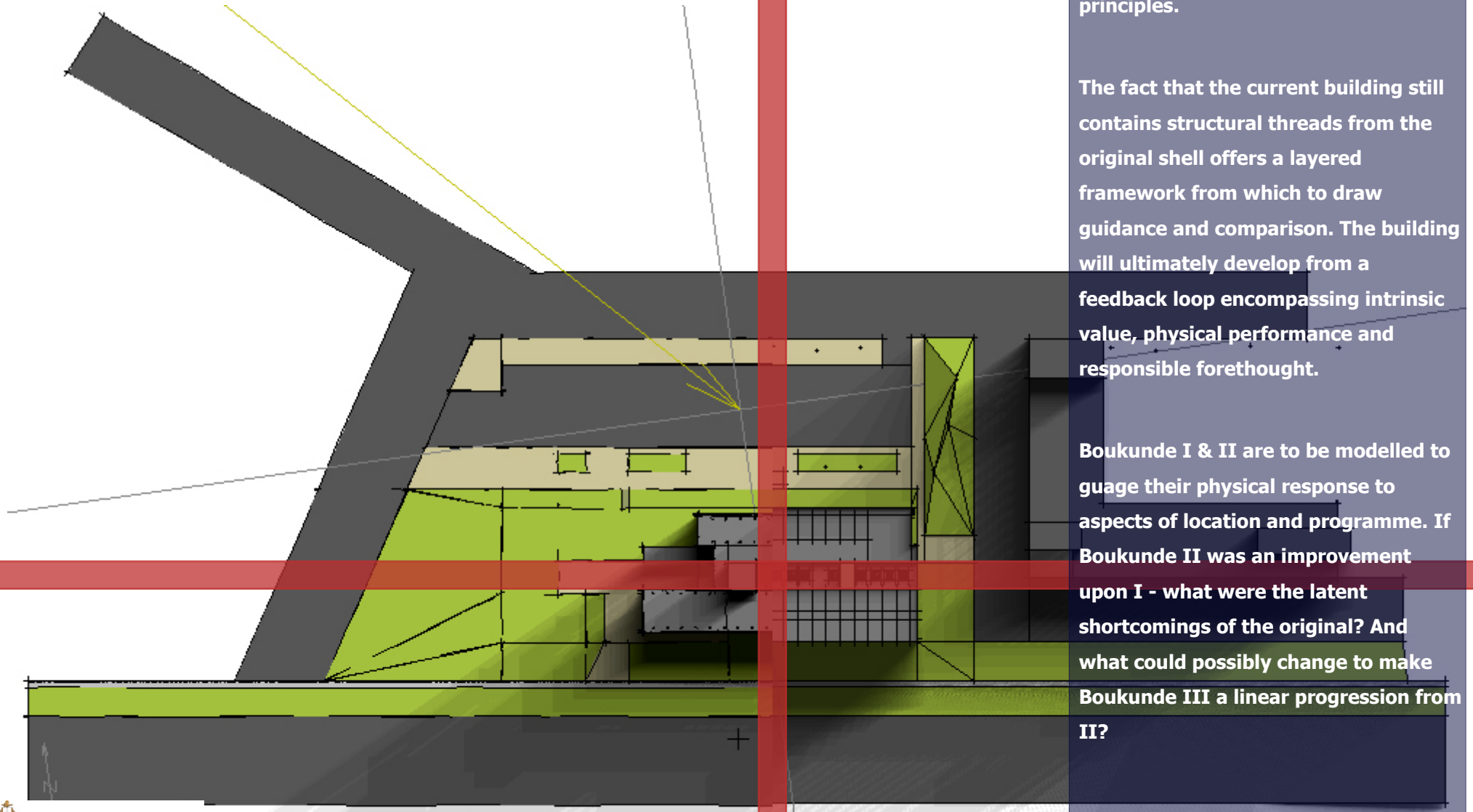
"Knowledge is only perceived as knowledge, by designers, when it is instrumentalised in specific appreciative contexts. It is for this reason that constructivism does not prescribe methods of teaching and learning. Artistry cannot be taught because definitions of artistry are contingent. Further, knowledge constructs are unique to individuals and cannot exist in a pure form outside of their own experience. This however does not preclude the mediation of individual learning. In Schöns terms, the designed object makes manifest the individuals production of knowledge or meaning-making process. It provides the occasion for social mediations. The reflective practicum becomes the dialogical space in which knowledge is collaboratively and socially constructed." (Gray. 2006:3)



Boukunde I possibly resembled an artists colony that revelled in the absence of modern-day fatalist concerns. One can assume that most, if not all - 1965 architecture graduates were oblivious to climate change prospects or the fact that the built environment was becoming a greenhouse gas juggernaut.

The building's lessons could not have fallen on deaf ears though, as Boukunde II clearly sought to address aspects of climate and location response. Whether this design response has been an unmitigated success and/or improvement upon the original is a matter for analysis and reflection.

The current inhabitants might possibly be more critical of their surroundings, and once they have digested the fact that the-earth-is-about-to-implode-and-their-chosen-profession-may-have-contributed- substantially-to-it's-demise, they can subjectively analyse the building's performance and take it's lessons into practice.



Using the prior iterations of the Building Sciences structure as reference and backdrop - the proposal for Boukunde III will evolve from a process driven by generative design principles.

The fact that the current building still contains structural threads from the original shell offers a layered framework from which to draw guidance and comparison. The building will ultimately develop from a feedback loop encompassing intrinsic value, physical performance and responsible forethought.

Boukunde I & II are to be modelled to guage their physical response to aspects of location and programme. If Boukunde II was an improvement upon I - what were the latent shortcomings of the original? And what could possibly change to make Boukunde III a linear progression from II?

"The situative perspective claims that learning takes place while you are in the process of participation in a community or with objects like technology. The focus is on meaningful interaction." (Constandius. 2006:6)

The primary computer modelling and analysis platform being used is ECOTECT, which will offer generative feedback on the performance of the existing- and pre-existing constructions. It will also then be used to validate the responsiveness of the proposal that emanates.

"...at the earliest stages of design it is only really possible to work with subjective issues as there is insufficient hard information about the building to calculate many of the objective criteria. Computer systems tend to be of little use in tasks that involve subjective or unquantifiable parameters, but excel at objective tasks with clearly defined and quantifiable parameters, and highly repetitive or iterative problems." (Haghparast. 2004:1)

In this instance however, there is sufficient "hard information" to base the modelling upon. The process of design is thus informed from the onset by an inventory of subjective- as well as objective criteria.