

GREEN LIVING SPACES AND WELL-BEING

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There are two on-going trends regarding people and their work habits. First, it is no longer uncommon for people to work long-hours everyday. The emergence of occupations such as those in the business process outsourcing (BPO) industry has also led to the mass subjection of employees to odd working hours. The same emergence has also helped lead to the second trend. More and more people are now able and opt to work from home. While it may seem amenable on the surface, the truth of the matter is that working from home is a next step towards breaking the traditional distinction between a home and a workplace. This leads to the bottom line that many people spends more and more time in environments that can be deemed stressful due to work.

Since such a setup makes escaping stressful environments more difficult, there is now a greater need to mitigate stress. Perhaps this can be achieved by enhancing the living space itself as to improve the well-being of its occupants.

TIER 1: Sustainable Building Design for Tropical Climates

Modern Philippine housing often takes inspiration from foreign influences. While these designs are definitely appealing to their inhabitants, some of these influences do not fit in well to the local environment. On the other hand, vernacular architecture, while drawn out of generations worth of techniques to address the context of the local culture and climate, has been largely abandoned.

The growing green building movement in the Philippines has already started to revisit the viability of vernacular architecture, but it remains outside the realm of mainstream property development and construction. In fact, green building in general faces its own barriers as it entails costs and adjustments which potential dwellers may not be willing to accommodate.

Perhaps there is a meaningful way of combining the local with the foreign, the modern with the traditional, into a living space design not just for the sake of aesthetics, but also for environmental conditions conducive to the well-being of its inhabitants. The accommodation of modern amenities cannot be discounted. While some of these amenities will lend to it, the harmonious relationship with the immediate environment will very much depend on green and vernacular architectural values applied. Lastly, if possible, this hybrid method of designing should avoid significant increases in building costs that can discourage its adoption.



Figure 1. Leaflet of a typical Philippine real estate development project advertising the use of “Swiss inspired” architecture.

Building Performance Aspects That Need To Be Addressed

1. Thermal comfort – a person’s psychological state of mind wherein there is a feeling of satisfaction out of how cool or warm the surrounding area is.
2. Acoustic comfort – being spared from undesirable noises from the outside of a building, or even from adjacent rooms is important for the psychological well-being of occupants.
3. Visual comfort – largely about natural and artificial lighting in good quality and quantity. Aside from occupant satisfaction, effective use of lighting can also increase energy efficiency and to some degree, thermal comfort.
4. Air quality – with people spending majority of their time indoors, indoor air quality is a critical issue affecting the well-being of occupants. The proliferation of synthetic and potentially hazardous substances in modern buildings has been known to make air quality worse indoors than it is outdoors.
5. Spatial comfort – design must take into account the freedom of movement of its occupants and their access to the amenities offered by the building.

All these criteria lead to the goal of increased energy efficiency. This is very important because buildings globally consume around 40% of the total energy produced and is the cause of 24% of global carbon dioxide emissions.

Factors To Consider

Climate may probably be the most important factor to consider in building design. Unlike most countries from which local modern real estate projects take inspiration from, with the exception of a few certain areas, the Philippines is subject to the following conditions:

1. A narrow, but very warm range of temperatures (except for highly elevated areas)
2. High levels of humidity, making the area feel warmer than it actually is
3. Large amounts of rainfall, whose patterns vary across the archipelago
4. Around 20 storms enter the Philippine area of responsibility every year, with at least one or two being exceptionally strong typhoons.

The Philippines is located within the Pacific Ring of Fire, making the whole country prone to earthquakes and volcanic eruptions. There are 37 volcanoes across the archipelago, 18 of which are considered active.

Another important factor to take into account is the local economy. The likelihood of adopting new building designs gets lower as immediate costs get significantly higher compared to traditional or more conventional ones.

How To Do It

Generally speaking, sustainable design can be achieved by following the checklist (or at least parts of it) below:

1. Smaller buildings
2. Use of recycled and renewable materials
3. Use of low-embodied-energy materials
4. Use of harvested lumber
5. Water catchment systems
6. Low maintenance
7. Recycling of buildings
8. Reduction of ozone-depleting chemicals
9. Preservation of the natural environment
10. Energy efficiency
11. Solar orientation
12. Access to public transportation

At this stage, it is not fully known just how realistic it is to fully comply with this checklist. Determining this will be one of the most important objectives should this turn into full-fledge research.

Greening Buildings

Populating the interior and exterior of buildings with plant life can be beneficial on different fronts. The most obvious benefit is the aesthetic value of a well-thought of garden(s). Second, vegetation is a proven mitigating agent against the heat island effect and can help lower ambient temperature. Green roofs further counteracts the heat island effect and is an effective

insulator, especially when compared to the galvanized iron sheets typically used in buildings as roofing material. Indoor gardens are also particularly helpful in the abatement of indoor air pollution, which can help prevent the sick building syndrome -- a very serious, but often overlooked problem in buildings with poor ventilation and those heavily dependent on active air conditioning systems. Poor ventilation can cause the accumulation of harmful substances that bring about health problems to inhabitants.

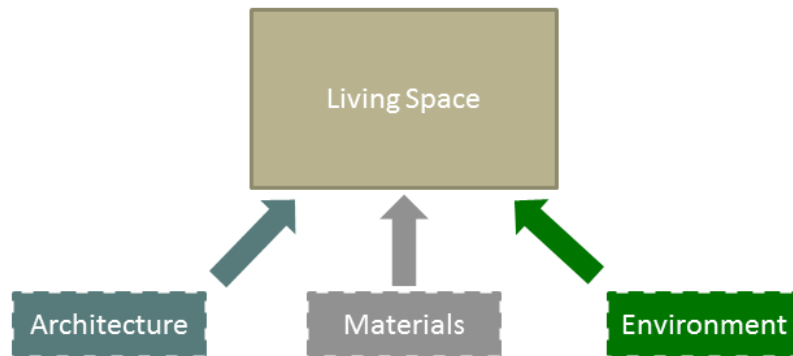


Figure 2. Biophysical factors affecting living spaces

Indoor gardening by itself is a realm of many possibilities. A 1989 NASA report noted a number of plants that thrive indoors in relatively low light conditions which are particularly effective in filtering airborne toxins. Indoor and roof gardening can also be taken a step further by adopting permaculture practices to actually raise crops at a small scale.

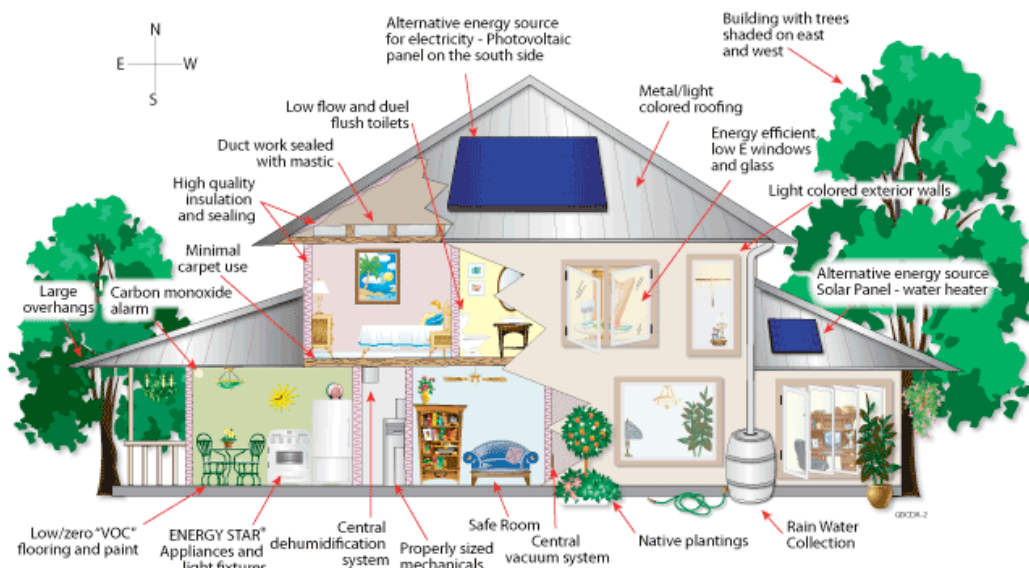


Figure 2. Anatomy of a green building (<http://www.arconstructioninc.com/greenbuilding.htm>)

Vernacular Architecture

Vernacular architecture was borne out of lessons learned about how buildings can exist more harmoniously with nature. Unfortunately, mainstream building projects have adopted building designs that primarily take inspiration, if not directly copied from Western values. While aesthetically pleasing to some people, the problem is that these designs more or less evolved through adaptation to the environment they were natively designed for.

The case of the “log cabin” shown in Figure 2 is peculiar. This is a house currently being sold that’s located in or near Tagaytay, a city south of Manila situated on a plateau. With its higher elevation and cooler climate, Tagaytay is a prime area for real estate development and is a hot spot for all sorts of Western inspired house designs. Location-wise, this log cabin is not even near a forest. It is apparently sitting on what used to be a pineapple plantation. Of course, one can say that there’s no rule saying a log cabin should only be built in or near the woods. A wooden house certainly has its advantages even under warm climates and open areas. Unfortunately, this particular house won’t benefit from them, as it is actually made of concrete made to look like logs. The effort required to mimic logs had surely raised the cost to build the house – money which arguably would have been better spent on actually making it *greener*.



Figure 3. A “log cabin” that’s actually made of concrete built on an open field (left) and a block design requiring multiple air-conditioning units (right).

It may no longer be possible to completely go back to using vernacular architecture. For example, the hut in Figure 3 exemplifies good insulation and airflow. Unfortunately, huts also have the downside of having a relatively short lifespan and cannot offer the security and amenities any modern house design would have.

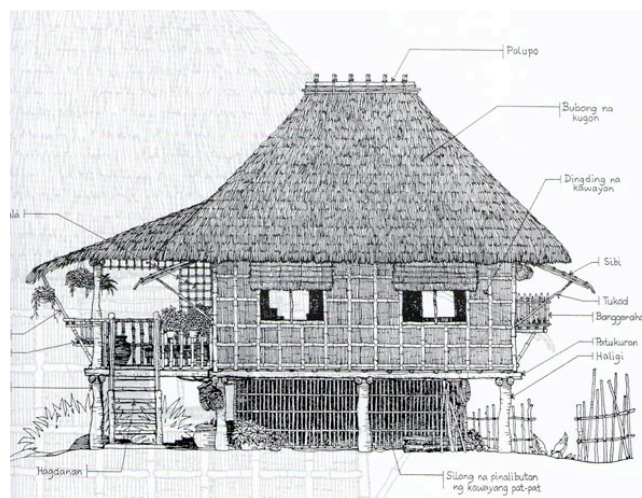


Figure 3. *Bahay kubo* – iconic traditional Filipino house

However, people may still benefit from the lessons it can teach. Methods on how modern and traditional values can be incorporated in a sustainable design, bringing the best of both worlds into play.



Figure 4. Upscale *contemporary modern* Filipino interior design



Figure 5. *Modern vernacular* design attempting to blend with a natural environment

A small post-modernist movement recently arose as a response to the disregard of traditional designs in favor of foreign ones, or worse, the disregard of building aesthetics itself to accelerate construction and cut costs. This heralded the return of vernacular and traditional designs from the mundane to the spectacular. However, good examples are far in between and are usually considered prime property. Furthermore, it is still unclear just how *green* these buildings are.

TIER 2: Living Spaces for Slowness, Relaxation and Well-Being

A living space is an important factor in the well-being of any individual. However, with all the bigger issues attracting attention, it is not uncommon for it to be overlooked. The effect of this neglect is exacerbated by the growing number of people working from home. This blurring of the line between living and working spaces highlights the importance of being more conscious of their qualities in relation to the overall well-being of their inhabitants.

While sustainable design heavily weighs environmental factors, it may or may not take into account for the factors beyond the physical well-being of those inhabiting a living space. An individual's overall well-being actually covers a number of aspects: physical, mental, social and spiritual.

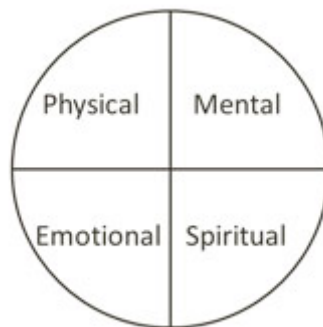


Figure 6. Facets of well-being

It is reasonable to consider that a relaxed state of body and mind can be considered an essential requisite for well-being. Therefore, it can be surmised that a living space conducive to relaxation can be of significant benefit to its inhabitant.

Approaches for designing sustainable living spaces that encourages relaxation and deceleration will be explored. Why this matters in a world that is concerned with speed and immediate gains will be reflected upon.

Effect of Architecture and Design on Human Behavior

It would be worthwhile to explore how architecture influences human behavior. Placement of corridors and pathways, as well as furniture and fixture placement practically dictates movement within a space. The arrangement of tables and chairs along with the availability of appliances such as television sets, a sound system or a game console has an effect on how inhabitants interact with each other. The proximity of an appliance to a bed also affects how they are used.

Manipulating these parameters will be crucial in enhancing the relaxation within a living space.

Ergonomics

Optimizing the design of all interactive objects within a living space is a key element in ensuring an inhabitant's well-being and maintaining a relaxed environment.

The problem with cookie-cutter living spaces is that they are designed under the assumption that one size fits all, or would at least cater to a lowest common denominator as far as human size and habits go. Fixture, furniture and appliance design and layout will have to be thoughtfully studied in order to accommodate the needs of its users.

Interacting With Nature

Studies have shown that interacting with nature or even the mere act of viewing nature provides cognitive benefits and improve overall well-being. It is therefore reasonable to surmise that bringing nature into living spaces through greening can bring about the same effect. This is in line with the points raised in Tier 1, whose implementation will be covered more comprehensively.

Practical Value of Traditional Cultural Practices

Traditional or even superstitious beliefs abound all over the world touching on well-being.

For example, *feng-shui* (wind and water) is an ancient Chinese belief system that has remained popular throughout the millennia. Commonly referred to as geomancy, *feng-shui* promotes one's being in tune with his or her environment to receive positive life force or *qi*. This is achieved through manipulating the situation and arrangement of the built environment with respect to the natural environment. *Oro plata mata* (gold, silver and death) is a Spanish-influenced Filipino superstition regarding the succession of steps in a flight of stairs. Ideally, the last step ends in gold which equates to good luck. Silver is considered acceptable, but under no circumstance should it correspond to death - obviously a sign of bad luck. This means that the number of steps must not be divisible by three.

Reception and acceptance in modern times have been mixed, but it is still worth looking into the underlying principles and logic behind these beliefs.

TIER 3: Convergence

The Gaia Theory holds that the Earth's physical and biological processes are inextricably bound to form a self-regulating system that has allowed life to thrive for eons. The question now is that whether or not it is possible to apply the Gaia Theory or at least certain aspects of it on a smaller scale. Is it possible to even come close to attaining a self-regulation system on a scale as small as a typical living space, such as a house, a shop or an office?

Incorporation of Information and Communication Technologies

On the surface, it is not difficult to deduce that naturally mimicking global scale self-regulation will not be possible as a typical living space obviously does not have the necessary level of biodiversity to create a stable feedback mechanism. But perhaps this is where information and communication technologies (ICT's) can come in.

Smart buildings have always used ICT to monitor building performance parameters such as ambient temperature, humidity and power consumption. There are also implementations where the building detects the presence of its occupants and adjusts conditions accordingly. However, much of these innovations focus on biophysical parameters. There is little or no concern over the other aspects of overall occupant well-being.

The framework shown in Figure 5 illustrates how ICT can augment the feedback mechanism between space and occupants. Furthermore, it is also a conduit to the outside world. Generally speaking, living spaces in the real world are not closed systems. This has been emphasized by the ubiquitous use of the Internet and social networking in recent history. Traditional dynamics within a household hardly applies anymore.

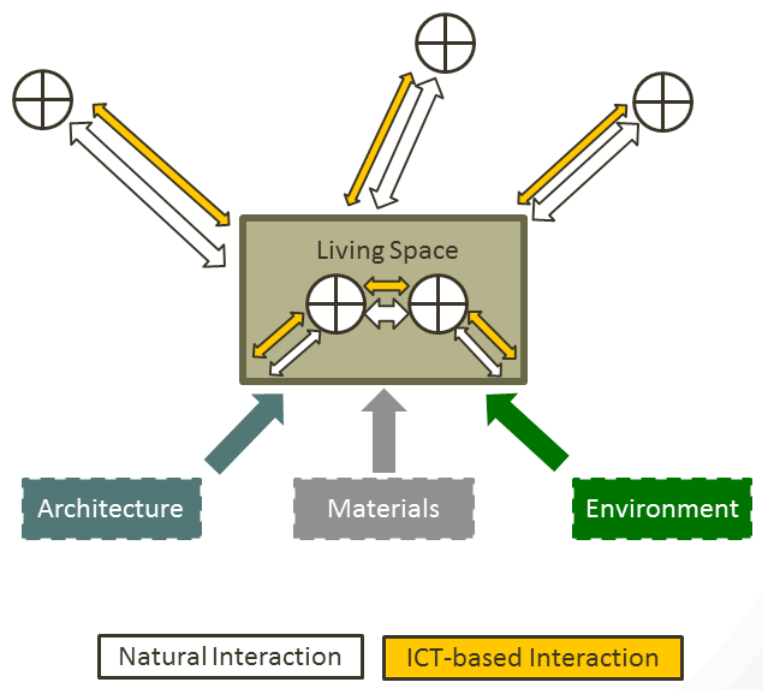


Figure 7. Convergence framework

The Biomodd Connection

This integration adopts the foundations Biomodd (<http://www.biomodd.net>) has been built upon. Synergy between technology and biology, environmental advocacy, social networking, collaboration, cross-culture – they can all apply. But whereas Biomodd has always been set within the context of a new media art installation, this research idea takes things a step further to create an actual living space. Conversely, there is no reason not to consider the whole thing as an art project in itself as the two previous tiers do touch on aesthetics. Back in 2009, the Biomodd[LBA²] team in the Philippines had already come up with suggestions approaching to this idea where the audience/users Biomodd are physically and virtually immersed within Biomodd . Unfortunately, time, expertise and resource constraints prevented many of these ideas from being implemented.

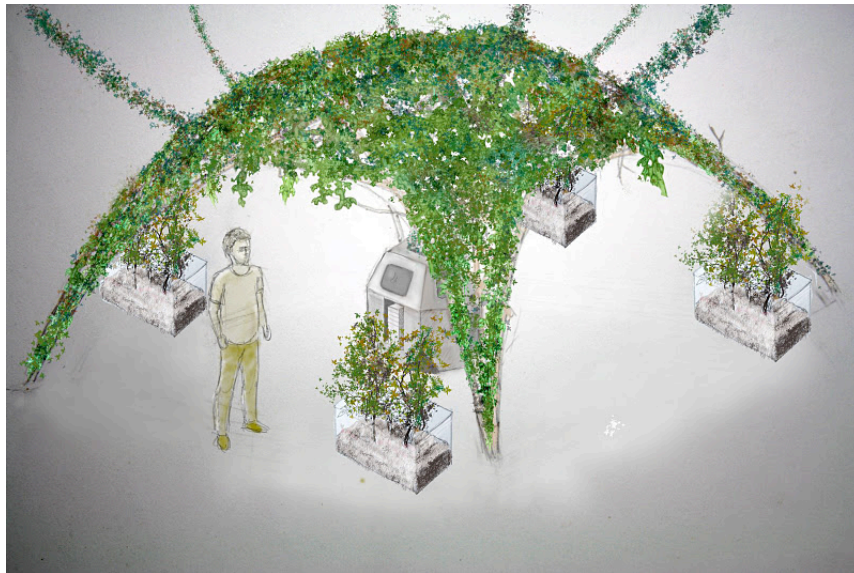


Figure 8. One of the earliest concepts for Biomodd[LBA²] and a higher level of immersion compared to Biomodd[ATH¹]

Data visualization was meaningfully incorporated in Biomodd[TUDeft³] in 2011. But aside from aesthetic value, data collected can also be used to complete a feedback mechanism and create some form of self-regulation within Biomodd, or in the case of this research idea, a living space.



Figure 9. Biomodd[TU Delft³] data visualization rendering environmental parameters within the installation.

The Big Picture

Each tier can probably stand alone, and it may even be more realistic to take them on one at a time, due to possible constraints on time and resources. But we believe that taking on the whole thing as one while collaborative research idea would be worthwhile.

We look forward to receiving any comment or suggestion you might have.

Thank you and best regards to everyone.

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