Greening the Architectural Curriculum in All the Malaysian Institutes of Higher Learning — It Is Not an Option

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Abstract
Preparations toward sustainability and energy efficiency in buildings begun about a decade ago with many aspects of tangible and intangible results such as the existence of a The Ministry of Energy, Green Technology & Water (MEGTW - Low Energy Office), The Malaysian Energy Center (Green Energy Office) and the forthcoming office building for the Energy Commission known as the Green Office. Other initiatives are the high efficient motor, the increase of the electricity tariffs, the introduction of the Renewable Energy as the 5th Fuel Policy with a national campaign known as the Suria 1000 where the use of solar electricity for the building industry is encouraged. At the same time there needs a parallel development for the critical mass otherwise initial noble efforts would be jeopardized due to lack of knowledge and skill support infrastructure. Training has been going on but only for specific tasks initiated either by non-governmental organizations (NGOs) or government agencies. But as for the architecture profession, the efforts fully depended on individuals’ interests and passion. This slows the process of assimilation and adaptation. There should be a thorough awareness throughout the practicing and academic architects as to the seriousness of having green buildings as the next future direction for Malaysian buildings. This paper does not attempt to set an agenda for education in architecture but rather to espouse the idea. It sets to show one way to accelerate the change in the mindsets of architects as a whole towards designing for architectural sustainability, is to revamp the architectural courses and curriculums in institutes of higher learning.

Keywords
Green architecture course, sustainability, green building index.
Introduction

It is common knowledge that to change the mindset from one viewpoint to the desired viewpoint is via education, training, and application. There is now the momentum in education to not only talk about sustainability in building designs among the professionals but also to act on it. Other countries have already applied for the so-called checklist to assess building compliance to given standards. Some examples already being applied and frequently referred to are the Leadership in Energy and Environmental Design (LEED) for the United States, the British Rating Energy Efficiency Assessment Method (BREEAM) for the United Kingdom, the GreenStar for Australia and New Zealand, the Green Mark for Singapore, the Comprehensive Assessment System for Building Energy Efficiency (CASBEE) for Japan. India has been using LEED for their assessment and they refer to it as LEED-India. Rating levels are given as Certified, Silver, Gold, and Platinum. As a variation, the hotel industry in Thailand has their own ratings and those hotels that subscribe to this system would be rated and given the number of Green Leafs. Five Green Leafs is the uppermost, just as the refrigerators in Malaysia and some other countries have been given ratings of one, two, three, four, or five Stars to epitomize energy efficiency in energy consumption (Azusa, 2009).

For continuity and consistency, it is right that every discipline in the building industry should take initiatives towards improving and assessing this system of assessment. The Malaysian Institute of Architects is taking a proactive measure to this effort to begin by the education sector in inculcating and educating the budding architects from the relevant Institutes of Higher Learning. It is felt that to nurture is better than to enforce, although enforcement has to determine immediate effectiveness.

This pilot study is being carried out between the Academic Section of the Malaysian Institute of Architects (Pertubuhan Akitek Malaysia (PAM)) and the University of Science, Malaysia (Universiti Sains Malaysia (USM)). As a whole even Malaysian public universities are given ratings such as Research Universities and non- research...
universities. And among the four research universities there is a need for an APEX (Accelerated Program for Excellence) Research University. By conferring designations like this means there is a form of ranking. There are at least 20 Institutes of Higher Learning (IHL) in Malaysia and only seven provide architectural courses recognized and to be recognized by the Board of Architects, Malaysia (BAM) as shown in Table 1.

Among the Institutes of Higher Learning as shown in the table above, UTM is the oldest university to provide an architecture program. UM is the oldest university in Malaysia but the architecture program was introduce about ten years ago. There are several basic components that need to be wisely integrated to produce future architects, such as the need to interplay among the educators, students, physical spaces, the program itself, course content, and the resource center.

Conventional Course Structural Components

Lecturers, students, studio, and course content, physical spaces, and the time factors are the normal variables that are needed to carry out any typical course. The existence of students is most important, for without them there is no reason why the course should exist. Students normally look at the length of time period of a course structure provided by the institutions. To spend a longer time in one institution than the others to achieve the same recognition would not be attractive enough for most potential students due to additional tuition cost and the employment opportunity cost. Normally a minimum of five years of architectural education is required for recognition of the architecture program. Students go through courses and studio exercises determined by the lecturers of the institution, and upon assessment would then gain their degree as recognition and license to work in an architect’s office before they embark on the Professional Practice Examination to qualify as a Professional Architect. Therefore, the variables such as lecturers, students, studio content, course content, and the time factor as mentioned above are important ingredients to make a successful architecture education. Of course the physical space was not mentioned because that is inherent when “studio” was referred to.

Figure 1 shows a diagram of a typical conventional architectural course structure where time and studio content are discussed in a sequence:
1. Year one to five shows the minimum time factor for an accredited architecture course.

2. A mini row column next to the year column represents a 2-week period i.e. the column to the right of the first column. Therefore each academic year has 28 working weeks with two 14-week semesters.

3. Throughout the year several design projects were given by the lecturers for the students’ progress and to assess them on two basic categories of skills (i.e. their design philosophy and the ability to portray their ideas via the required methods of visualization). Design philosophy will present rational and intelligent way of providing space requirements, whether vertical or horizontal and as common to all schools of architecture all over the world, the need for plans, elevations, sections, and perspectives by mode of manual hand sketches or with the aid of computer-aided-design software.

4. Within the stretched arrows are the number and complexity of projects deemed fit by the architecture committee or the studio coordinator. Generally, the first year will have more short term projects to familiarize the architecture students with the basic skills needed for them to carry them through to the five-year program.

Evaluations from the point of view of sustainability were rarely done by most lecturers. Students develop design strategies from reading magazine articles such as Architects Journal, Architecture Today, Architecture Malaysia etc. (Hancock, 2008). Case studies should focus more on the successful designs that save the environment and a deeper understanding of the climatic elements in determining the shape of buildings would eventually be the norm. With the world approaching hot, flat and crowded, this has to change (Friedman, 2008).

**Figure 2** shows that the trend is now towards improving the environmental performance of houses by design and material choice as a passive strategy and also from energy-efficient active systems. It shows the summary of the energy consumption for representative of domestic buildings from a simple shelter in a hammock under the shade of a tree up to the proposed bioclimatic house typology. The simplest shelter has no energy involved, so it has zero energy but it is not appropriate for living conditions. Therefore the Malay Traditional Village house was constructed responding well with the climatic conditions for the rural areas and the Colonial House
epitomizes the urban prototype of a traditional house, both using less energy since at that time the population is small and development less hectic and furthermore electricity is cheap. But the modern house cut corners due to increased population and economic growth. Comfort at that time refers to material comfort and not environmental comfort, because air-conditioning was easily available. Thus energy consumption was high. With the advent of global warming, architects must develop an acceptable bioclimatic house, bearing in mind the thermal behavior as shown in Graph A below.

The arrow pointing downward shown in the circle shows that a paradigm shift is needed to examine the criteria in designing future buildings in Malaysia. To solve problems affected by global warming, one must be in a totally different frame of thinking and not in an existing frame of mind. In other words, one needs to be thinking “out of the box” with different set of design rules.

[...]

Conclusion
The current climate change crisis triggers fundamental changes in building practice and our environmental inhabitation. It is no more a matter of providing equal efforts and opportunities for the three common sectors (economy, culture, and the environment) when discussing on the course content and emphasis for any discipline. At the Copenhagen 2009 conference on climate change, COP15, it was reported that the world climate temperature has risen to an average of 2°C--more than the usual average. A lot more effort by member countries needs to happen to bring down carbon emissions. This might result in overhauling economic sector priorities, resulting in indecisive and dismal conclusion of the summit.

One has to be aware that if the environment is down to its lowest ebb, the culture and economy will be fundamentally affected as well. The task now is to identify design methodologies that suit these new climatic scenarios by developing tools and techniques to mitigate local and global scale in human impacts. The Malaysian Green Building Index helps in re-conceptualizing the architectural curriculum. In it there are sustainable criteria and points to strive for which makes it easy to measure and assess. Anything that can be measured is easily
managed. Therefore it is not specifically for USM to create a niche in its architectural program but should be taken up by other IHLs.

Advancements in technology will be a major breakthrough toward sustainable building practices “The question may be: why haven’t we always been working with something that was compatible with Nature? Ironically, it often takes dramatic circumstances to become aware of the need to take responsibility of our own actions and to adopt all the possible solutions to wisely utilize our intellect and efficiently manage our resources so as to achieve well-being in our “habitats.” However, if we succeed in using our knowledge to support and celebrate the Earth’s intricate web of biological (and cultural) diversity, and we recognize nature as the very archetype of human creativity, the transition to an adaptive and carbon-free building design practice is achievable since we may already have all the know-how needed. The sustainability of our future depends on getting this right.” (Altomonte, 2008).

It is not an option but a dire need to save the world. We need buildings that are efficient, comfortable, adaptable, and durable, but this can also mean beautiful, exciting buildings, contributing to places that make sustainable living easy, affordable, and attractive (King, 2008). The mindsets of lecturers have to change. They should attend relevant seminars, do research, and from research findings present papers, write books, and submit articles, all pertaining to sustainability. Existing lecture materials need to be upgraded or overhauled to meet climate change demands and examinations to be geared towards green building. For many of the staff in the IHLs this meant retooling, retuning or even reeducating oneself to suit new goals in not only the subjects they teach, but to incorporate them in the studio teaching.

Future lecturers must have backgrounds in sustainability, specifically those with knowledge of Green Building Index where the Architecture course at the Universiti Sains Malaysia is concerned. Existing staff are required to attend classes on GBI so that when they impart knowledge, appropriate vocabularies are used, which changes concepts and priorities in future buildings. This may reduce the influence of the iconic images of much publicized works by Frank Gehry, Zaha Hadid, Santiago Calatrava, etc. because the sustainability approach often puts more emphasis on context and locality and pragmatic solutions to produce energy-efficient designs (Abdul Samad et.al 2009) It can sometimes be contradictory to the
iconic portrayal of architecture. It is a task for educators to shift the students’ attention to emulate the work of sustainable architects who may not receive as much publicity or attention. The World Trade Centre of Bahrain is an exception. But once the momentum on sustainability in building designs catches on, buildings like the Bahrain WTC, though championing the green approach, would be slow to be emulated because good sustainable architecture can also mean deconstruction.

When the Malaysian Prime Minister pledged to the world that the country is going to reduce carbon dioxide by 40%, the academics must realize that it is not an option. Only in this way will there be conspicuous and tangible movement in influencing the minds of the students because the lecturers themselves are the prime movers. The architect cum lecturer can and must be at the heart of this process.

References


MS1525:2007: Code of Practice on Energy Efficiency and use of renewable Energy for Non-Residential Buildings (First Version); Department of Standards Malaysia.

### Figure 1

<table>
<thead>
<tr>
<th></th>
<th>Design philosophy</th>
<th>Visualization</th>
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<tr>
<td>Year 1</td>
<td></td>
<td>Space: <strong>10 Design Projects</strong> Structural system: Multi Discipline</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td>Plans, Elevations, Sections, Perspectives (CAD or manual)</td>
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<tr>
<td>Year 3</td>
<td></td>
<td>Project 1, Project 2, Project 3, Project 4</td>
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<td>Year 4</td>
<td></td>
<td>Project 1, Project 2, Project 3, Project 4</td>
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<tr>
<td>Year 5</td>
<td>RATIONALIZATION</td>
<td>only 1 project</td>
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Figure 2
### Table 1

<table>
<thead>
<tr>
<th>Public Universities</th>
<th>Status</th>
<th>BAM’s Accreditation</th>
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<tbody>
<tr>
<td>1. Universiti Sains Malaysia (USM)</td>
<td>Research University APEX status</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>2. Universiti Putra Malaysia (UPM)</td>
<td>Research University</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>3. Universiti Teknologi Malaysia (UTM)</td>
<td>Non RU base</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>4. Universiti Malaya (UM)</td>
<td>Research University</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>5. Universiti Teknologi MARA (UiTM)</td>
<td>Non RU base</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>6. Universiti Islam Antarabangsa Malaysia (UIAM)</td>
<td>Non RU base</td>
<td>Part I &amp; II</td>
</tr>
<tr>
<td>7. Universiti Kebangsaan Malaysia (UKM)</td>
<td>Research University</td>
<td>(In process for Part I)</td>
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Part III qualification which is the Professional qualification is the responsibility of BAM and do not fall within the auspices of the Universities

**Private Institutions of Higher Learning** (in process for recognition for Part I)

| 8. Taylor's College                             | Non RU base                          |
| 9. University College Sedaya                    | Non RU base                          |

*Table 1*: The Seven Malaysian Universities Offering Professional Programs in Architecture. (Source: Author).