Towards a more Sustainable Architectural Education in Malaysia

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Abstract

The role of higher education in creating a more environmentally sustainable future is irrefutable. However, there is currently no clear evidence of definitive framework in training the professionals to be environmentally literate. The article is an extended analysis of a survey conducted to assess the level of integration and implementation of sustainability issues in the curricula of programmes at the schools of architecture in Malaysia. It looked on the level of awareness and training background of educators on sustainability and the sustainability content in studio projects and related courses. Based on the earlier findings, this article recommends the organisation of more training programs related to sustainability, the revision of existing curricula to inculcate sustainability awareness at lower years and the incorporation of humanistic aspects of sustainability into architectural education.

Keywords: sustainability, architectural education, integration, curriculum, Malaysia

1. Introduction

The importance of teaching sustainable design to architects is conclusive. Agenda 21, the United Nations Programme of Action from Rio de Janeiro, identifies environmental education as one of the catalysts for sustainable development (UN, 1992). There is a growing recognition that sustainable development policies, plans and actions have more chance of implementation when they are supported by an educated, informed public (UNEP, 1999). Environmental education provides recipients with an understanding of the key environmental issues facing the world today. It presents an outline of the issues, the scientific background and the role that humans play in both exacerbating and minimizing negative environmental impacts. It also introduces the concept of sustainable development.

The need to introduce issues of sustainability into an architectural curricula has become critically important. The year 2005 marks the commencement of the United Nations Decade of Education for Sustainable Development, which is an opportunity as well as a challenge for educators of all stripes to reorient their teaching, research, and community outreach towards sustainability. Since architects play a vital role in the creation of our built environment, then it is imperative that students, who are our future architects, be aware of how their attitudes, behaviours and actions will impact our future natural environment and the health of people. There can be no responsible design without a responsible designer (Findeli, 2001). Hence design education should be redirected to the development of an ethical designer, one who could think and radically "design out design that delivers environmental problems" (Fry, 1993). Indeed, design education for sustainability now can help usher a promising future by transforming the architects of tomorrow.

So how has the Malaysian architectural education community responded to this challenge for responsible and sustainable solutions? Are academics adequately informed of strategies for environmentally oriented building development? Are students provided with opportunities for imagining solutions that foster sustainable behaviours of building design? Are environmental aspects considered along with traditional design criteria in assessing student works? These and other related questions are the focus of this paper. It further recommends some future strategies to improve the integration of sustainability in Malaysian architectural education.

2. Architectural Education in Malaysia

The Board of Architects Malaysia (LAM) and the Malaysian Institute of Architects (PAM) are two organizations that play varying roles in architectural education in Malaysia. The LAM is a statutory authority responsible in determining the standard for entry into the architectural profession and the accreditation of programme of study in architecture. For this purpose, the Council of Architectural Education Malaysia (CAEM) was formed under the auspices of LAM to regulate all matters relating to architectural education (LAM, 2005). The PAM is an architectural organization representing architects in Malaysia with over 1600 corporate members. The PAM has a standing committee on education and takes an active role to coordinate, facilitate and advance the pursuit of excellence in architectural education in Malaysian institutions; and to educate the future architects (student/ graduate members of PAM) in preparing for professional practice and the building industry (PAM, 2002).

The curricula for Malaysian schools of architecture is generally based on the British system with LAM Part I and Part II (equivalent to RIBA Part I and Part II respectively) qualification requirements. Upon graduating from a school of architecture that is accredited by LAM (4 schools in Malaysia, 15 in Australia, 1 in Hong Kong, 1 in Eire Dublin, 2 in New Zealand and 35 in the UK), graduates are exempted from having to sit for the LAM Part I and Part II Examinations and are eligible to enrol as an "Architect" with LAM. After gaining a minimum of 2 years of post-graduate working experience under the supervision of a Professional Architect, graduates are eligible to sit for the LAM Part III Professional Practice Examination conducted by LAM. Upon passing the LAM Part III Examination, one can register as a Corporate Member with PAM and as a "Professional Architect" with LAM (LAM, 2005).

Among the aspects of architectural knowledge concerning sustainability indicated in LAM's Policy and Procedure for Accreditation of Architectural Programmes that are recommended to be included in the programme of study are:

Ability to create architectural designs that satisfy both aesthetics and technical requirements and which aim to be environmentally sustainable; and an adequate knowledge of the means of achieving environmentally sustainable designs (LAM, 2005).

It can be concluded that regulators of architectural education recognize the importance of sustainability. There remains the question of how to achieve integration of sustainability into the framework of the architectural curriculum.

3. Current ideas in Sustainability Teaching

Despite the obvious need for more sustainable design education in schools, many architecture schools have not developed a clear idea on how to integrate these issues into the curriculum (Nguyen and Pudlowski, 1999; Elliot, 2004, Ramirez, 2006). Most programmes tackle the problem by offering targeted electives on energy efficiency, or by adding more information to an already overburdened studio pedagogy. Some students still argue that it is only a fad and it will go away sooner or later, like many others before. Architects are not scientists or engineers and should not concern themselves with energy and environmental issues. Evaluation of the environmental impact of their architecture is not part of the design process. However, many fail to see that environmental design has true relevance to architectural design, that it is a mechanistic process and the domain of the specialist. As a result, various design education surveys and studies done in the disciplines of architecture (Fowles et al., 2003; Wright, 2003), engineering (Nguyen and Pudlowski, 1999; Abdul-Wahab, 2003) interior design (Metropolis, 2003; Elliot, 2004; Ramirez, 2006) and mixed design disciplines (Metropolis, 2002) have generally shown that sustainability issues are hardly penetrating into core design programmes.

One of the pertaining issues in architectural education is to strike a balance between humanistic issues (social, cultural, economic and spiritual) and environmental and technological issues. This is reflected in a report by the Sustainability Special Interest Group (Fowles et al., 2003), who researched the learning and teaching of sustainability across the curriculum in UK schools of Architecture. They laid out several necessary changes to ensure a sustainable future such as:

(i)   considering a holistic or systems thinking;
(ii)   understanding the interdependence of environmental, technological, social, cultural, economic and spiritual issues in design;

(iii) integrating design which features interdisciplinary collaboration along with user and community contributions;

(iv) recognizing and acting upon our responsibilities to humankind and the planer over and above those required through codes of conduct and legislation and

(v) critically questioning the values which influence our decision making, and asking ethical questions such as: What is the social, ecological and environmental 'good' towards which built environment designers and decision maker ought to strive for?

Similar concern is expressed by Edward (2002) who insists that:

The Challenge is how to incorporate these (sustainable) requirements into the methods and content of architectural education, and more importantly how to do this across the curriculum, in theory, history, technologies, humanities etc, and in the design project, so that sustainability knowledge and skills become natural component of the architect's mindset and underpin their value system (Edward, 2002).

There is also a need to inculcate sustainability awareness at foundation level of architectural education. Acknowledging this need, the Royal Institute of British Architects (RIBA) has initiated "Criteria For Validation" which specified the need to develop basic sustainability knowledge and skills as early as its Part 1 curricula (RIBA, 2002) and several Schools of Architecture in UK are already working towards achieving this. Some of these schools even plan to go beyond the point of simply 'making the students aware'. Starting at undergraduate level, they plan to introduce more sophisticated sustainability issues such as sustainability benchmarking, indicators and other tools as a 'measuring process' during design stages (Fowles et al., 2003).

Similar argument is proposed by (Kim and Ringdon, 1998) who discerns three levels of educational objectives, namely, in ascending progression:(1) "Creating Environmental Awareness", (2) Understanding Building Ecosystems, (3) Ability to Design Sustainable Buildings. They argued that it is much easier to instil an environmental consciousness at the formative stage of education than in later stages. The later stages merely deal with students' application of skills and knowledge of sustainable design by exploring various technical methods and techniques.

In conclusion, we illustrate that efforts are being taken to integrate sustainability in building education in many universities in the world. The next section explores the current state of sustainability teaching in Malaysia.

4. Current Practice in Malaysian Architectural Education

The current practice in teaching sustainability in Malaysian architectural education is being investigated. The discussions in this section are based on the survey conducted by Shari and Jaafar (2006) to assess the level of awareness and training background on sustainability; and sustainability contents in studio projects and related courses in Malaysian schools of architecture. This section summarises issues of importance and areas of improvement in integrating sustainability in Malaysian architectural education. New recommendations are being proposed on top of the previous the findings of the aforementioned study.

4.1 Study method

The Shari and Jaafar (2006) study involved a questionnaire survey sent to seven (7) public universities and two (2) private higher education institutions that offered undergraduate diploma and degrees programmes in architecture as listed below:

i. Universiti Putra Malaysia
ii. Universiti Teknologi Malaysia
iii. Universiti Malaya
iv. International Islamic University Malaysia
v. Universiti Sains Malaysia
vi. University Teknologi MARA
vii. Universiti Kebangsaan Malaysia
viii. Lim Kok Wing College University
ix. Alif College Sdn Bhd

The questionnaire was divided into quantitative and qualitative parts. The quantitative part was structured to establish the training background of educators with regards to sustainability, to seek their views on sustainable design approach and ascertain their current teaching practice in green design. The qualitative part was aimed at identifying obstacles in promoting sustainability in architectural education; and to suggest

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initiatives that can be adopted to guide and support educators to enhance the delivery of sustainability in educating future Malaysian architects. Statistical analysis on the quantitative data was done using SPSS Version 11.5 software. Of the 135 questionnaires sent, 67 academics (response rate of 50%) replied, and all 9 schools have been represented by at least 3 respondents.

4.1 Sustainability Training Among Educators

In order for sustainability to be successfully embedded in architectural education, it is only logical to expect the educators to be adequately informed and knowledgeable in sustainability themselves. This section examines issues of training initiatives among educators with regards to sustainability knowledge. It found that most educators obtain their knowledge through their personal initiatives (see Table 1). Their initiatives include browsing through the internet, reading related books for information, etc.

Table 1: Percentage of respondent's main sources of information on sustainability issues (Source: Shari and Jaafar 2006)

Source of information	Frequency	Percentage
Personal initiatives	41	25%
Co-worker	21	13%
Media/ article	53	32%
Course/ training	27	17%
Workshop	22	13%
Total	164	100

Attending programmes i.e. courses, trainings, seminars, workshops, symposia, conference or other modes of continuing education, are still not the prevailing means to increase respondents' knowledge on sustainability. A possible explanation could be that there is a scarcity of such programmes in relation to sustainability being held in Malaysia as suggested by a few respondents (see section 5.2). Therefore, our first recommendation is for the government and universities to organise more continuous and systematic training programmes to increase the sustainable literacy among architectural educators.

Shari and Jaafar (2006) also investigated the levels of concern with sustainability issues among educators. It found that there is a correlation

between their levels of concern with their level of education (refer Table 2). The result shows that the 'highly concerned' group is predominantly those with masters- and/or PhD-degree holders. Therefore, our second recommendation is to increase the level of sustainability awareness among educators with first-degree qualifications.

Table 2: Relationship between respondent's education level and their level of concern with sustainability issues (Source: Shari and Jaafar 2006)

Education level		Level of concern			Total
		Little	Moderate	Highly	
Education level	Degree	2	10	6 (20%)	18
	Masters	0	5	14 (47%)	19
	PhD	1	1	10 (33%)	12
		3	16	30 (100%)	49

4.2 Sustainability in studio teaching

Upon investigation of sustainable design strategies implemented in studio teaching, Shari and Jaafar (2006) found that the top four strategies are "Exploitation of natural ventilation", "Emphasis on passive solar design eg. orientation, exploitation of daylight and shading", "Preservation of natural elements on site (trees, slopes)" and "Emphasis on Low Energy Design eg. energy-saving lighting, insulation and glazing type". Meanwhile, the bottom three strategies are "Community Building", "Low maintenance materials" and "Waste Recycling" (see Table 3). This finding indicates that sustainable design strategies implemented in Malaysian design studio are more concerned with energy and environmental issues. There is an apparent lack of attention to the social (i.e. human health, comfort and convenience, safety and security, culture and heritage etc.) and economic dimensions (i.e. functionality and efficiency, flexibility and adaptability, affordability, access to resources etc.). This argument is supported by the fact that no respondent was able to come up with any alternative strategies. This run counter to what Edward (2002) and Fowles et al. (2003) suggested, that a balanced holistic approach of sustainability must be taken in architectural education.

Table 3: Mean scores of integration of sustainable design strategies in design studio (Source: Shari and Jaafar 2006)

Sustainable design strategy	Mean	SD
1. Natural ventilation	4.16	.875
2. Passive solar design	3.98	1.068
3. Preservation on site	3.91	.960
4. Low energy design	3.66	1.163
5. Community building	3.57	1.171
6. Low maintenance materials	3.48	1.112
7. Waste recycling	3.03	1.242
8. Others	0	0

The mean scores of sustainability integration in design studio are shown in Table 4. It shows that even though sustainability is introduced since Year 1, the level of integration is still considered quite low. However, the situation improves as students progress into the upper years. A significant number of respondents seem to disagree with the trend and suggested that sustainability teaching must also be emphasized during the foundation years. This suggestion is in agreement with Fowles et al. (2003) and Wright (2003) who argued for sustainability awareness to be inculcated as early as first year. Therefore, our third recommendation is to formulate a strategy on how we can increase the level of sustainability awareness among lower year students in Malaysia as early as in year 1 or year 2.

Table 4: Mean scores of sustainability integration in design studio teaching (Source: Shari and Jaafar 2006)

Design Studio Year	Mean	SD
Year 1	2.72	.972
Year 2	3.24	.916
Year 3	3.73	.877
Year 4	4.12	.766
Year 5	4.37	.711

4.3 Sustainability in non-studio teaching

In analyzing non-studio courses, Shari and Jaafar (2006) found that "Technology courses" are more embedded with sustainability issues compared to "History and Theory courses" and "Practice and Management courses" (refer to Table 5). This could be the reason why technology and environmental issues of sustainability are more emphasized in design studio as had been discussed earlier. This is not dissimilar to what is happening in the UK as reported by Fowles et al. (2003). They found that 22 out of 36 architecture schools in the UK have detailed courses on sustainability but little attention is paid to social and economic sustainability and the major emphasis has been on energy conservation in buildings. We concur with Edward (2002) that this can be a problem since it needs to encompass other aspects of sustainability such as philosophy, economy, ecology, culture and social issues in order for sustainability to be successfully integrated into the curriculum. From the analysis of sustainability integration in studio and non-studio teaching discussed above, our fourth recommendation is that a more balanced approach towards sustainability in architectural education should be taken.

Table 5: Mean scores of sustainability integration in non-studio teaching (Source: Shari and Jaafar 2006)

Courses	Mean	SD
History & Theory Courses	3.47	1.028
Technology Courses	4.02	.812
Practice & Mgmt Courses	3.27	.990

Shari and Jaafar (2006) have also found that Malaysian educators tend to integrate sustainability into their teaching based on their own initiatives without clearly spelling it out in the curriculum (see Section 4.1), hence, our fifth recommendation is in line with Fowles et al. (2003) and Wright's (2003) recommendation on the need to emphasize the importance of integrating sustainability in an architectural programme with sustainability components explicitly stated in the curriculum.

5. Identification of Barriers and Suggestions to Mmove Forward

This section presents the qualitative data of the perceived barriers and recommendations provided by the respondents on how we can further promote and develop the engagement of sustainability in Malaysian architectural education.

5.1 Barriers

A total of 109 barriers were identified and then categorized into 8 different categories: *Educator, Resource, Government, Student, Public, Subject, Curriculum and Monetary Factors.* Table 6 shows the ranking of these factors.

Table 6: Ranking of 8 categories of respondent's perceived barriers in promoting 'sustainability' in architectural education
(Source: Shari and Jaafar 2006)

Rank	Category of barriers	Frequency	Percent
1	Educator Factors	49	45.0
2	Resource Factors	16	14.7
3	Government Factors	11	10.1
4	Student Factors	8	7.3
5	Public Factors	8	7.3
6	Subject Factors	7	6.4
7	Curriculum Factors	6	5.5
8	Monetary Factors	4	3.7
	Total	109	100.0

Table 3 illustrates that the most cited barriers fall predominantly under the category of 'educators factors'. Among the specified barriers under this category are lack of exposure or knowledge; lack of training/education in sustainable design/construction; lack of awareness; ignorance and negative attitude towards sustainability; and lack of interest and enthusiasm. Here, Shari and Jaafar (2006) argued that these barriers are caused by poor dialogue and co-ordinations, leading to a lack of commitment from everyone in developing a sustainable agenda. Studies by Yang and Giard (2001) and Metropolis (2002) state that the lack of academic staff training as well as the lack of time for education are two frequently cited obstacles against integrating sustainability themes into design education.

The second most cited category of barriers falls under 'Resource Factors'. Among the barriers identified by the respondents are shortage of sustainable building literature in local libraries and the scarcity of successful sustainable building examples in Malaysia.

Thirdly, the respondents list barriers related to 'Government Factors' as an impediment to the adoption of 'sustainability' in architectural education. Some respondents feel that the lack of act and enforcement by the government regarding any issues of sustainability as well as the lack of agencies promoting the issues are among the barriers to promote sustainability in the architectural education.

Next, under 'Student factors' category, the barriers are related to attitude and linked mainly to the lack of interest and understanding on the issues of sustainability. Under 'Public Factors' category, several respondents state that the problems are inherent in the building industry itself. The drive to achieve value for money and competitive procurement (through large and remote contracts) are all perceived as barriers in achieving sustainability.

Further down the list, under the category of "Subject Factors", several issues relating to the subject matter of sustainability itself were identified. One problem expressed by respondents is that the breadth and complexity of sustainability issues is beyond their understanding. Taking a wide view of related comments, there is a possible inertia among educators due to the difficulty in trying to make sense of the 'abstract' and then moving to 'do-able' projects. Some respondents even considered that sustainability is merely 'fashionable'. Others regarded sustainable development as 'specialist', 'multi-layered' and 'complex', requiring expert knowledge to make good decisions.

Another toughest barrier is under the category of "Curriculum factors". It is often described as being saturated already with little scope for additional content. Some respondents referred to courses where it was difficult to embed sustainability into their teaching in which, due to their existing content and purpose. This issue is complex but there seems to be evidence that some academics are already incorporating sustainability in the teaching of a wide range of subjects, as well as institution-wide developments in this area.

Finally, barriers under the 'Monetory Factors' category were also identified. Among the barriers identified is the lack of funding facilities for research. Some respondents have argued that the extra costs incurred when implementing sustainability in a development project do hinder sustainable practice in the building industry. This is compounded by an issue raised by some respondents that the energy cost in Malaysia is still cheap, hence the motivations to adopt sustainable practice is low.

The results of Shari and Jaafar's (2006) study support Shafii and Othman's (2005) argument that the major barriers holding back the development of building and construction of sustainable buildings in Southeast Asia are the lack of awareness of sustainability issues in related

professions; a lack of research and professional networks; a lack of political motivation and incentive; and a lack of well documented references, tools, techniques, case studies and demonstration projects which are relevant to local conditions. Their surveyed respondents indicated these barriers clearly in the study (Shari and Jaafar, 2006).

5.2 Recommendations

In response to respondent's opinion on how to promote 'sustainability' in Malaysian architectural education, 60 suggestions were obtained and categorized into 6 categories (see Table 7). Overwhelmingly, 45% of the respondents suggested that existing curriculum in their schools should be reviewed and revised in order to promote 'sustainability' in architectural education. The respondents recommended to fully integrate the subject into all course works. This suggestion supports Wright's (2000) claim that for sustainability to succeed it must become the binding element of the architectural education and practice. It must not be strongly identified with a particular area of architecture, such as environmental science. Nearly half of the suggestions recommend the incorporation of sustainability at the earliest stage possible in architectural programmes. The respondents also suggested more 'continuous educational programmes' i.e. seminar, conference, training, courses and etc. to increase awareness among students and academics on issues of sustainability.

Table 7: Categories of suggestions to promote 'sustainability' in Malaysian architectural education (Source: Shari and Jaafar 2006)

Category of suggestions	Frequency	Percent
1. Curriculum review	27	45.0
2. Educational programs	13	21.7
3. Research requirements	8	13.3
4. Public & private support requirements	6	10.0
5. Regulatory requirements	4	6.7
6. Publicity requirements	2	3.3
Total	60	100.0

Researches that address the issues of sustainability are to be given more emphasis by universities. Research funding agencies are also mentioned as an enabler. Respondents suggested that regulatory institutions should be more open towards public participation in local and regional development whose action supports the sustainability agenda implementation. Government's step to develop more real life sustainable projects is also highlighted as an effective move towards enhancing public's awareness on the importance of sustainability in the built environment. On the regulatory aspect, respondents suggest that explicitly embedding sustainability requirements in by-laws would govern more practicing architects and educators to instil sustainability in their projects and teachings. Lastly, a small number of respondents even recommended the local media to play a role in generating more public awareness towards environmental sustainability.

6. Conclusions

The article is an extended analysis of a survey conducted by Shari and Jaafar (2006) to assess the level of integration and implementation of sustainability issues in the curricula programmes in schools of architecture in Malaysia. A set of additional recommendations is proposed to assist in the process. These recommendations are based on both the quantitative analysis of the current status of sustainability teaching in Malaysia and the qualitative analysis of the survey. The extended analysis found that the results of the qualitative study correspond positively to the earlier quantitative results, hence cross-validating this study. We summarise the main recommendations as follow:

- Organise more training programmes to increase the sustainable literacy among younger generation of architectural educators;
- Increase the level of sustainability awareness among educators with first-degree qualifications.
- Revise the existing curriculum to fully embrace the construct of sustainable design as well as to inculcate sustainability awareness among lower year students in Malaysia. Efforts should be made for non-technological courses—such as philosophy, economy, ecology, culture and social issues—to be integrated with other aspects of sustainability.
- Emphasis funding by universities and research funding agencies for researches which address sustainability issues.

In conclusion, we believe that sustainable building design has the potential to become a standard practice if the education industry continues to find ways to incorporate some of the recommendations outlined in this

paper. It is hoped that the relevant agencies and parties could implement these recommendations as a guide in promoting sustainability in architectural education and indirectly in the building industry in general.

7. Acknowledgements

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