

Observations of Sustainability Practices in Malaysian Research Universities: Highlighting Particular Strengths

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ABSTRACT

Although Sustainable Higher Education (SHE) is a very important issue in Malaysia, there have not been any comprehensive studies related to the current public Higher Education initiatives and efforts in sustainability. It is a relevant issue which merits a proper study to evaluate both the strengths and deficiencies of the local universities in terms of sustainability. Thus, to carry out this objective, an exploratory method was conducted by reviewing archival data, observation, interviews, as well as short and long conversations with both the staff and students of the four selected Malaysian research universities. The observation, interviews and conversations have validated the archival research. The results indicated that Malaysian research universities have already recognized the concept of SHE and embarked into the sustainability movement. However, there still remains a big gap towards achieving the idealistic goals. The findings would throw some insights into the existing policies and initiatives of SHE which could serve as a reference and preliminary study to improve the current situation.

Keywords: Sustainable Higher Education, Malaysian research universities, Sustainability initiatives

INTRODUCTION

Sustainable development is popularly described as “a development that meets the needs of the present without compromising the ability of the future generations to meet their own needs” (Brundtland, 1987, p. 19). Malaysia is actively engaged in international pacts concerning sustainable development efforts. She is one of the signatories of Agenda 21, as one of the most popular sustainability declaration. Agenda 21 very explicitly addresses the importance of Higher Education Institutions in its Chapter 36. Educational institutions have largely been instrumental in discovering the growing crisis facing the world (Shriberg, 2002a). Despite

the activists' calls for higher education to lead society on a sustainable path, there is little systematic guidance available for campus sustainability advocates and scholars (Shriberg, 2002b). Therefore, it is necessary to figure out what is the existing situation of the Malaysian Universities in terms of sustainability and what are the rubrics of their Sustainable Higher Education (SHE). This paper attempted to grasp the important rubrics of SHE by performing a vast literature review on the initiatives of the western universities and the existing situation of the Malaysian Research Universities. With archival research and triangulation strategy, the authors have analyzed both students and

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university's authority feed backs and observation of the first author, in the span of 30 months. The sampling for the interviews made use of the saturation point theory.

DEFINITION AND LITERATURE OF SHE

Sustainable Higher Education has been defined differently, but addressed as the same concept by different scholars. For instance, Velazquez *et al.* (2006, p. 812) defines it as "a higher educational institution, as a whole or as a part, that addresses, involves, and promotes on a regional or a global level, the minimization of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfil its functions of teaching, research, outreach and partnership, and stewardship in ways to help society make the transition to sustainable lifestyles." However, Svanström (2008) refers to it as a higher education of which the philosophy's hub of its mission, based on the definition of sustainability by Brundtland and acts upon local and global responsibilities to protect and enhance the health and well-being of both humans and eco-systems. Finally, Cole (2003, p. 30) defines it as "an institution which actively engages the knowledge of the university community to address the ecological and social challenges that we face now and in the future." To conclude the definition, it can be said that SHE considers the convenience of the people and university ecology both at present and in the future.

The Stockholm Declaration (UN, 1972) was the first to make reference to SHE, and has recognized the interdependency between the environment and humanity. However, based on the Association of University Leaders for a Sustainable Future (ULSF), the first official statement in campus sustainability was "Talloires Declaration," which was introduced in 1990. This declaration was signed in an international conference in Talloires, France. To support this agenda, United Nation Educational, Scientific and Cultural Organization (UNESCO) took the first pace on a worldwide basis to foster the SHE

movement. For this purpose, UNESCO designed a framework entitled Decade of Education for Sustainable Development (DESD), which was officially launched in January 2005, and its related programme which must be completed by December 2014 (Velazquez *et al.*, 2006). Nevertheless, slow progress to all aspects of sustainability is worldwide spread, and inefficient progress in higher education has been assessed and found to yield more frustrating results (Jey, 2004).

Alshuwaikhat and Abubakar (2008) stated that as a result of the realization of the impacts of universities operations over the environment, SHE has become a global concern for university decision makers. Hutchison (2004) declared that there has not been any institution in the modern society which is better situated and more obliged to facilitate the process of transition to a sustainable path than higher education institution. In addition, the pressure from sustainability movements, government environmental protection agencies, university stakeholders, as well as the momentum of other forces, including students' activism and NGO's, have intensified this trend (Orr, 2004).

FIVE IMPORTANT RUBRICS OF SHE

Introduction and Origins

Analyzing 30 American and Canadian universities and institutions' sustainability initiatives in the span of two years led the authors to categorize the major rubrics of SHE based on their frequency. Thus, an archival research method was carried out in the time frame of 2006-2008 to achieve this goal. This archival research method was conducted using books, published and unpublished journal articles, conference proceedings, reports, university websites, theses, newsletters by the Association for the Advancement of Sustainability in Higher Education (AASHE) and the documents on Education for Sustainability Profile available at the website of Second Nature. In doing this part, the material was context analysed and categorised. The three rubrics of operation outreach and services, and administration have

already been recognized as sustainable rubrics of a company (Weenen, 2000). What makes universities distinctive from companies is their academia. Therefore, two more titles (courses and curricula and research and scholarship) in referring to University leaders for Sustainable Future guideline (ULSF, 1992) were selected to cover the university sustainable initiatives.

All the relevant initiatives driven from the context analysed were put into table form. The heads of the columns were the five rubrics. The selection criteria for categorizing were based on the meaning of the initiatives. It was observed that all fitted in those tables. A telephone interview was carried out by 11 international scholars to confirm and validate the categorization. The interviews were selected based on their relevant publications in refereed journal in the field of Sustainable development. Implying their comments, which were confirming the procedure and literature, caused some wording change and categorizing the initiatives into five rubrics. The five rubrics are: 1) Sustainability in Policy, Planning, and Administration, 2) Courses and Curricula, 3) Research and Scholarship, 4) University's Operation, and 5) Outreach and Services.

Sustainability in policy, planning and administration

This topic investigates the extent to which formal written statements of an educational institute contain sustainability issues (ULSF, 1992). It contains institutional missions, planning of an organization and its structure. It embeds how universities have articulated sustainability in their vision, mission down to their policies. Although there are criticisms that universities' mission and vision may have been used for a long time in universities, which are not very easy to be amended, taking them as rubrics will encourage them to change and show their tendency to sustainability. Sydney University of Technology is an example where its main policies orbit over sustainable development to undertake and promote scholarly jobs towards sustainability (Weenen, 2000).

Courses and Curricula

This topic considers the number of courses, which are being taught at an institute or a university, and embeds sustainability of the syllabus and different programmes, such as Masters of Sustainable Development, which teaches sustainability-related issues. An example is East Arkansas Community College - Forrest City in USA which offers three programs in Renewable Energy Technology in the fall semester of 2009 (EEAC, 2009).

Research and scholarship

The topic concerning SHE includes research and scholarship. In this field, the number of studies, which have fulfilled sustainability and the number of scholarships or fellowships in a limited period of time, were also taken into account as indicators for sustainability efforts. An example of this rubric is University of Montana which received a \$300,000 grant in July 2009 from the National Science Foundation to research on sustainable ethanol production (NWM, 2009).

University's operation

This topic indicates the different practical actions which are being fulfilled in the campus territory. These include: 1) source reduction of toxic material, 2) source reduction of radioactive waste, 3) sustainable landscape, biodiversity, lawn minimization, native plants, protecting against invasive plants, 4) pesticide control and pest management, 5) sustainable dining and organic food, 6) sustainable transportation, 7) waste reduction scheme, 8) recycling of solid waste management, 9) sustainable purchasing, 10) sustainable construction and renovation, 11) sustainable energy or energy efficient management, 12) renewable energy (solar energy), 13) indoor air quality, 14) CO₂ reduction and reducing air pollution, 15) conservation of culture and heritage, 16) ergonomics, 17) equity and poverty, 18) handicapped people's facilities, 19) occupational health and safety, and 20) global climate. Several scholars, such

as Holden *et al.* (2008), Ramos *et al.* (2008), Wright (2007), Armijo de Vega (2008), and Weenen (2000), as well as some institutions like the ULSF, and Association for the Advancement of Sustainability in Higher Education (AASHE), have addressed parts of these issues. An example of this rubric is Colorado State University in USA which has installed USD 35000 photovoltaic cells to operate in a more sustainable style and reduce greenhouse gas emission (CSU, 2009).

Outreach and services

This topic addresses the interaction of sustainability issues between an educational organization and its surrounding neighbourhood. In other words, how a university or a college can increase the awareness of non-academic people or help them to move forward to the goals of sustainability much faster. Some examples of these are participating programmes, distance learning, collaboration with industry, organizing workshops, as well as programmes and seminars. An example of this rubric is University System of Ohio in USA which has launched collaboration with Ohio Environmental Council to link education and training with sustainable industry jobs (USO, 2009).

MALAYSIAN HIGHER EDUCATION AND RESEARCH UNIVERSITY

Malaysia has 20 public universities, 24 polytechnics, 37 community colleges and other private and foreign university branches (MOHE, 2008). Four of these universities have been accorded the status of Research University. This entitles the four selected universities to receive higher research grants than other public universities. The four universities are University Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM), and Universiti Putra Malaysia (UPM) (*ibid*).

STUDY METHODS

This study employed several methods. In the first phase, initiatives and documents from 30 western universities and institutions were

perused and analyzed to get the major rubrics of SHE (as explained in the previous sub-section). The second phase employed archival study method, involving documents, newspapers, articles and websites, to investigate different initiatives, and sustainable efforts in the four selected Malaysian universities.

The two other study methods validated the findings, namely observation research and interviews. In particular, the observation research was carried out for 30 months, beginning November 2006 to May 2009. The types of recording included taking notes and photographs. Meanwhile, the interviews consisted of two parts. Firstly, 10 semi-structured open-ended, face-to-face, and self-administration interviews were carried out. The interviews involved members of top-level university management, such as vice-chancellors and their deputies, and very experienced lecturers and the staff who are in-charge of matters pertaining to sustainability or campus management. The second part involved short and long conversations with students and academicians. The interviews were tape-recorded and transcribed verbatim and were analyzed. The results of the analysis were sent to the interviewees to check the accuracy of the interpretation. The second part was performing short and long conversations. These conversations were carried out by conversing with 19 university lecturers and 38 post-graduate students. The saturation point theory was used in sampling the study. The fact that the interview and observation form in the qualitative part, the issue of sampling is therefore not very significant and thus, it is better to employ saturation method (Kumar, 2005). This means that in a qualitative research, it is not necessary to determine the extent of the diversity, while the qualitative aspect only supports the archival research.

SUSTAINABILITY IN POLICY, PLANNING AND ADMINISTRATION

University Malaya (UM)

University Malaya, the oldest university in Malaysia, was established in April 1949; it has a total of 26,963 students and 1,918 academic

staff (UM, 2008). Its mission and vision are consecutively “to advance knowledge and learning through quality research and education for the nation and for humanity, and be an internationally renowned institution of higher learning in research, innovation, publication and teaching” (UM, 2009). In addition, UM has 10 core values, namely “integrity, respect, academic freedom, open mindedness, accountability, professionalism, meritocracy, teamwork, creativity, and social responsibility” (UM, 2009).

It appears that only the social aspect of sustainability has been considered in the statements of the university’s mission and vision, and there is no mentioning of environmental and economic issues at all. Emphasizing on humanity in their vision is an indicator of this claim (ibid). However, one of the core values of the University of Malaya is social responsibility, whereas its fourth clause is respect to environment and sustainability (ibid). UM has also included Integrated Approaches to Sustainable Development Practice as one of its policies.

Universiti Kebangsaan Malaysia (UKM)

Universiti Kebangsaan Malaysia is the national university which was formally established in 1970 and comprised 22,605 students and 1,582 academic staff (UKM, 2009).

Its vision is “to be a leading university that pioneers innovation in the construction of knowledge to achieve the aspiration of producing a society imbued with dynamic, learned, and civic leadership” (UKM, 2008).

Its mission is “to be a premier university which ennoble the Malay language and disseminate knowledge encapsulated in the national culture” (UKM, 2008).

The philosophy of this university is “a combination of faith in Allah and beneficial knowledge and of theory and practice as the basis for the advancement of knowledge, the education of society and the development of the University (UKM, 2008).”

In its mission and vision statements, the concept of sustainability is not directly recognizable, but it has referred to the social aspect. UKM has a sustainable programme, i.e. Sustainable UKM Charter, which aims to push its campus more towards sustainability (UKM, 2008).

Universiti Sains Malaysia (USM)

USM was established in 1969, with 20,842 students and 1,287 academic staff (USM, 2008). USM is the only university in Malaysia which was awarded the Accelerated Programme for Excellence (APEX) status in 2009 (USM, 2009). The title of USM’s programme as an Apex university is “Transforming Higher Education for a Sustainable Tomorrow”, and this clearly shows the focus in the policy of USM towards SHE.

The mission of the university is “to lead and innovate in achieving excellence at the international level through advancing and disseminating knowledge and truth, instilling qualities which stress academic excellence and professionalism, developing holistic individuals, providing a strong commitment towards the society’s aspiration, the country’s vision, and universal aspirations”(USM, 2008).

The vision of its Institute of Post-Graduate studies is “to spearhead USM to become a world-class university by embarking on research programmes via strategic planning and implementation of its R & D mechanism” (USM, 2008). In the fourth mission of USM, social sustainability is tacitly cited.

“The University in a Garden” concept has also been embedded in the university design (USM, 2008b). This concept is very popular and well-known in USM, and even a book with the same name has been published in the university (Ibid). A Healthy Campus Programme, entitled “Kampus Sejahtera” an excellent innovation of USM, was initiated in 2001 (USM, 2008). “Kampus Sejahtera” is a programme which steers the whole USM community towards sustainability (Ibid). USM has a defined post

for sustainability matters, i.e. the Coordinator of Sustainability.

Universiti Putra Malaysia (UPM)

UPM was formally established in 1972, and it has 29,352 students and 2,137 academic staff (UPM, 2008). Its vision is “to become a university of international repute” (UPM, 2008). Meanwhile, its vision is “to be a leading centre of learning and research, contributing not only towards the creation of wealth and nation building, but also towards universal human advancement and discovery of knowledge.”

UPM has 10 strategic goals; to produce quality graduates who are competitive and resilient; to strengthen UPM students through mastery of soft skills; to transform UPM into a renowned research university; to strengthen UPM as a centre of excellence in agricultural education and research; to strengthen UPM network with industry and society; to manage human capital and work environment excellently; to enhance a quality management system based on good practice to; effectively generate and manage University financial resources; to make UPM fully connected based on Information and Communication Technology (ICT); and to strengthen UPM through its alumni.

The social aspect of sustainability is addressed in the mission of the university. Besides, in two goals of the eight goals of the university, the concept of environmental and economic sustainability has also been embedded. These are “to enhance a quality management system which is effective, efficient, transparent and client-friendly” and “to effectively generate and manage University’s financial resources, and to establish UPM as the Centre of Professional Development Services and Continuing Education.” The Faculty of Design and Architecture in UPM has a journal entitled “Alam Cipta: International Journal on Sustainable Tropical Design Research and Practice” which specifically focuses on the issues pertaining to sustainability.

SUSTAINABLE COURSES AND CURRICULA

University Malaya

According to a research report entitled, Planning for implementing Education for Sustainable Development, sustainability has not been neglected from the eyes of this university’s researchers even before 2001 (Zeeda, 2001). UM has joined “Global Classroom”, which aims at helping to create bold new leaders, by offering a Master’s level course known as the “Integrated Approaches to Sustainable Development Practice” which links leading problem solvers with hundreds of graduate students all over the cosmos through new web technology (The Earth Institute, 2008).

Some programmes offered in UM contain sustainability issues. For instance, Bachelor of Environmental Engineering, Bachelor of Environmental Science and Management, Bachelor of Ecology and Biodiversity are among the undergraduate programmes which contain various topics on sustainability. In the Masters and PhD programmes, such as Master of Safety Health and Environment, Master of Environmental Technology, and Ph.D, different aspects of sustainability are the on-going programmes provided at UM. Centre for Research in Biotechnology for Agriculture (CEBAR) “is a physical and virtual centre which teaches sustainability issues and researches on it” (UM, 2008). Based on the results from the interviews carried out among UM post-graduate students, UM offers courses which include or touch on sustainability issues, such as ecology and people. However, there is a need for a comprehensive investigation to be carried out in order to figure out the real statistics to be done.

Universiti Kebangsaan Malaysia

Institutes, such as the Faculty of Science and Technology as well as other centres at UKM, are teaching issues related to sustainability and researching on it. The School of Environmental and Natural Resource Sciences has programmes

which entail sustainability issues, and there is a specific research programme entitled, "Sustainable Use of Natural Resources" (UKM, 2008). Bachelor of Environmental Health, Bachelor of Civil and Environmental Engineering, Bachelor of Environmental Science, Bachelor of Social science, Master of Engineering Environmental Studies, Master of Environmental Science, Master of Engineering and Environmental Geophysics, Master of Environmental Conservation, Doctor of Philosophy in Environmental Conservation, Doctor of Philosophy in Environmental Management are among the programmes which address sustainability issues.

Based on the name and syllabus of the courses and the results of interviews conducted as supporting method among post-graduate students, some courses have been found to contain the issues which can contribute to the different aspects of sustainability; however, their proportion is still very small. It was discovered that the university authorities were aware of these deficiencies. Some of them are working, based on the interviews explained in sub-section 5, to find a solution.

Universiti Sains Malaysia (USM)

Some faculties and institutes, such as the Centre for Education, Training and Research in Renewable Energy and Energy Efficiency (CETREE), are teaching issues related to sustainability (USM, 2009).

USM offers a variety of courses and programmes related to sustainability; these include Masters and PhD of Science in Coastal Ecosystem, Plankton Ecology and Productivity, Insect Biochemistry and Physiology, Master of Environmental Engineering, Master of Social Science in Gender Studies (USM, 2008). Even its Graduate School of Business offers a type of MBA entitled, Masters of Business Administration in Sustainable Development (USM, 2008). Based on the data gathered from the interviews with the post-graduate students, some courses contain issues relevant to sustainability, such as Environmental Impact

Assessment, Air and Noise Pollution Control, and Sustainable Drainage System. However, no comprehensive study has been done to uncover the extent of integration of these issues in different courses (Meng, 2007).

Universiti Putra Malaysia

UPM teaches sustainability issues in different faculties and institutes. In particular, some faculties such as the Faculty of Biotechnology and Biomolecular Sciences focus more on topics related to sustainability.

The Bachelor of Environmental Management, Bachelor of Science (Human Development and Management), Master of Environment, Master of Science in Environmental Management, PhD of Environmental Science, PhD of Environmental Management, PhD of Community Development are among the various programmes which are offered at UPM, and these incorporate issues relevant to sustainability (UPM, 2008). In terms of course and curricula, UPM in the first semester of 2007- 2008 offered 39 courses at the post-graduate level which included sustainability issues (UPM, 2007). Some examples of these courses were the Environment Pollution and Treatment Technology, Environmental Impact Assessment Techniques, Impact Assessment and Environmental Management Plan, Trade, Finance and Sustainable Development, Sustainable Development Theories and Issues.

SUSTAINABLE RESEARCH AND SCHOLARSHIP

University Malaya

UM has established the Centre for Equatorial Sustainable Design (ESD) and the Centre for Research in Biotechnology for Agriculture (CEBAR) which aims at enabling researchers to better coordinate inter-disciplinary collaboration in the pursuit of sustainable research excellence, as well as offering distance learning programmes. Masters in Bio safety is a good evidence to prove the interest of this particular university in this trend (ibid).

The allocations of a variety of funds to students, such as different fellowships, scholarships and grants, are among the actions done to move the campus community towards more economic sustainability.

Such fund designated for the Post Doctoral research in Sustainability ranges from MYR66,000 to MYR90,000 annually (International Scholarship Resource, 2007).

This includes performing on-going research which address the different aspects of sustainability, such as “Sustainable tourism facilities on eco-sensitive sites in the tropics” (a PhD thesis), “Advocating for barrier-free Built Environment” (a funded research project), and “Eco-literacy school” (Yasmin, 2008).

Another example is the allocation of a private company’s funds by Sime Darby amounting to RM 2.5 Million funding for sustainable research (Sime Darby, 2008). In addition, there are also local and international collaborations with other universities to research on sustainability issues, such as “Problem-Oriented Project Based Learning in Environmental Management and Technology” between Malaysia, Denmark, and the Netherland (MUCED-I&UA, 2006).

Universiti Kebangsaan Malaysia

In the form of scholarships, funds have been provided for the students to pursue their research in UKM (UKM, 2009). In particular the Institute for Environment and Development (LESTARI) specially provides opportunities for students to carry out various research pertaining to environment and sustainability. The main goal of this Institute is to fulfil the aspiration of the university, as envisioned by the United Nation’s Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, i.e. to conceptualize the aim of sustainable development through research and capacity development (LESTARI, 2009).

Currently, these are three main researches being focused on at this institute; these are Research Centre for Sustainability Science and Governance (SGK), Research Centre for Environmental, Economic and Social

Sustainability (KASES) and Langkawi Research Centre (PPL) (ibid). For instance, LESTARI encompasses a variety of topics such as the SGK, comprising of five sub-groups related to Ecosystem Studies, Sustainability Assessment and Planning, Urban Ecosystem Sustainability, Malaysian Mountain Ecosystem Research Initiatives (MMERI), and Malaysian Network for Integrated Management of Chemicals and Hazardous Substances for Environment and Development (LESTARI, 2009). KASES, on the other hand, encompasses three sub-groups, which are Environmental Hazards, Environmental Economics, Community Well-being and National Tropical Rock (ibid). It is important to highlight that this institute has had 41 collaborative researches, 33 fundamental researches, and 21 contract research in different areas on sustainability (LESTARI, 2009).

UKM has also housed Lake Chini Research Centre which researches on restoring the Pahang Biosphere Reserve Lake and its surrounding wetlands (Shahabudin, 2008). The Institute of Solar Energy Research (SERI) is another institute in UKM which studies on issues related to sustainability (ibid). In addition, proposing a new design paradigm for green zero energy public toilet is another achievement in the realm of sustainability.

UKM has obtained around RM229 million research grants from various sources, in which a sizable part of it is being paid to the students to work on some specific topics. Parts of these research grants are exclusively allocated for topics on sustainability. For example, in the experimental and applied research grant, six projects have been defined to research on Energy and have so far received a total of RM1, 282, 696.00, and nine projects on Environment which received RM1,915,166.00 (UKM, 2009).

Universiti Sains Malaysia

In research and scholarship, 17 monographs and books containing issues on sustainability in the campus have been published only by *Kampus Sejahtera* (Meng, 2007). In more specific, USM has funded and collaborated in 50 projects related



Fig. 1: UKM working on sustainability issues in Langkawi

to issues on sustainability, under the “*Kampus Sejahtera*” programme (ibid). Eight percent of 5861 research projects, conducted by USM between 1974- 2007, incorporated issues related to sustainability (ibid). Meanwhile, 11% of 1,800 papers have been published in the Institute for Scientific Information (ISI). Some 19% of the conference papers (out of 2,200) are related to sustainability. USM has offered several types of scholarship such as USM fellowship which gives RM1,500 for first year Master students, RM1,800 for second year Master students, RM2,100 for first year PhD students, RM2,300 for second year PhD students, and RM2,500 for third year PhD students (USM, 2009).

Universiti Putra Malaysia

In research and scholarship, UPM has given financial support, such as fellowship or different kinds of research assistantship, to majority of the students. During 2007 – 2008 for instance, more than 500 fellowships were offered for both Malaysian and international students (Malaysian Scholarship Centre, 2009).

Some research in different faculties address the issues related to sustainability. At the Faculty of Design and Architecture for example, nine out of 12 PhD students were fulfilling their research in Landscape studies, and these were nine out of 18 students addressing issues on sustainability in Architecture (FRSP, 2009).

Some of the institutes which are researching on issues related to sustainability include the Institute of Bioscience, Institute for Community and Peace Studies, Institute of Tropical Forestry and Forest Products, Faculty of Environmental studies, as well as Faculty of Design and Architecture (UPM, 2009).

SUSTAINABLE OPERATION

University Malaya

In terms of operation, Recycle Project is considered as an effective action of SHE in parts of UM (Azizan, 2005). Specific needs of the campus users such as restaurants serving middle eastern dishes and food have been established on the campus. Providing these eating places will let the sizable number of middle eastern students to cater for their favourite foods inside the campus without having to travel and produce emissions of green gas. Parts of the lighting system at UM use fluorescent lamps which consume less energy and are more efficient.

Moreover, UM has made attempts at conserving the energy use in its buildings by using reflective colours in the building facades so as to decrease the heating absorption (*Fig. 3*).

UM campus not only has been covered by municipality transportation fleet but also by private shuttles with the aim to encourage people to use public transportation. However,

based on the conversations with the students and lecturers, majority of them still prefer using private transportation to go home or even around the campus.

Universiti Kebangsaan Malaysia

UKM has also recognized the use of recycling bins as an effective action of the SHE. However, recycling bins are provided only at certain limited areas.

The on-going initiatives by the university to conserve energy include encouraging the students to turn off the lights and computers at

some faculties, as well as constructing buildings which use passive ventilation for their cooling (see Fig. 4). In addition, UKM has unique and beautiful flora and fauna, with various indigenous sustainable landscapes, as shown in Fig. 5. The results gathered from the interviews with the students and lecturers indicated that private transportation is the most common mode of transportation, which is a big challenge for this university. For this, both the students and lecturers explained that they preferred using own transport to go home due to the inefficiency of the public transport available.



Fig. 2: UM provides comfortable buses, but majority of the students still use private transportation



Fig. 3: UM has various types of landscape



Fig. 4(a): UM uses bright and reflective colours for/in buildings to conserve the cooling energy



Fig. 4(b): UM uses natural lighting in its building

Universiti Sains Malaysia

USM provides some bicycles at its sport centre to encourage students to have a more sustainable transportation mode (Meng, 2007). In addition, organizing different campaigns, such as “No Straws Campaign”, “Say No to Plastic Bag Campaign”, “2,700 New Undergraduates’ Pledge to Go Green”, “Banning Polystyrene Containers”, were other initiatives which have been done at the university (see *Fig. 3*). Moreover, USM has decided not to invest in the industries related to tobaccos, gambling or liquor (Ibid). This university has been quite successful

in its efforts to protect the environment; for instance, some red eagles were found nesting in the campus on 23 January 2009 (USM, 2009a). Furthermore, the university has a policy which emphasizes on purchasing green products. Apart from that, recycling programme, rain water harvesting, restriction of motorcycle use to reduce noise, energy management programme and energy consumption audit and air quality, have also been introduced by the university. However, some of these initiatives have yet to be properly implemented (see *Fig. 7*). Selling organic food which is produced near campus is another activity done (see *Fig. 10*).



Fig. 5: Using passive ventilation for cooling buildings



Fig. 6: Green landscaping at UKM



Fig. 7: Banning motorcycling without effective enforcement



Fig. 8: USM researches on different modes of transportation



Fig. 9(a): Banning the use of poly-styrofoam in USM and using washable plate



Fig. 9(b): Encouraging the ban on poly Styrofoam in USM



Fig. 10: Organic food sold at the entrance of USM

Universiti Putra Malaysia

UPM also has taken similar initiatives. Among other, recycling bins are easily available at the different faculties all over the campus. In addition, public transportation has also been boosted via shuttle services. Both city and university's buses cover the different routes throughout the campus and the surrounding residential areas.

Cycling lanes are provided in parts of the university. Some of its lecturers, such as the former vice chancellor and former deputy dean of the Faculty of Design and Architecture, prefer cycling as their mode of transportation on campus. Interestingly, there is a lecturer, from the Faculty of Environmental Studies, who exclusively uses bicycle as the only mode of her transportation both inside and outside the campus (Star, 2007). Potable water heaters and coolers have been catered in most of the hostels and study rooms to prevent the students from using their own water heaters and coolers. A total of twenty hostels and one big international housing complex have housed students inside the campus to reduce distance involved in transportation (UPM, 2008). Two large condominiums at affordable rental rates ranging between USD 150 to USD 350 were constructed near the university (UPM, 2009).

Based on the authors' observations which were carried out for a period of two and a half years, the university was found to provide luxurious shuttle buses for the residents of these condominiums to go to university campus. Among the four selected universities, UPM is the only campus to have a mosque, a church and a Hindu temple which are located inside the campus. Besides, there are also Muslim and Chinese cemeteries which are adjacent to UPM. Normally, making university autonomous causes less transportation and gas emission.

On top of this, the majority of the hostels and all the faculties at UPM have been equipped with free internet connection, either inside the students' rooms or at public places. As an agriculture university, UPM has farms inside the campus, which are not only used by students for research purposes, but also provide some food supplies to meet the needs of UPM's residents. Based on the conversations carried out with the participants and the observations done, it seems that transportation still poses a big challenge to UPM and the other selected universities.

COMMON OPERATIONAL PRACTICES AT THE FOUR UNIVERSITIES

Majority of the campus users' needs, such as banking facilities, restaurants, swimming pool, sports complex, grocery shops, stadium, laundry,



Fig. 11: Providing shady side walk and cycling lanes is a good example for UPM



Fig. 12: Recycling bins at all faculties are parts of the facilities provided on campus

tailor shops, binding and photography services, mosque, clinic, and even petrol stations, as well as shopping malls, have been catered for inside the campus or places which can be reached in less than five minutes by cycling. Even the hostels and different faculties have housed the essential needs of their users independently and it is common to see courts for various sports such as tennis, volleyball, and basketball, football fields, as well as laundry and grocery shops, cafés and restaurants, parks, and study areas provided at these hostels.

These universities, by assisting students to organize different associations for foreign students, embarked to distinguish the different

needs of their international students and provide them with special needs such as restaurants serving Middle Eastern food and delicacies. All these result in lesser need for transportation and lower Green Gas Emission (GGE). Transportation service has been boosted by buying new shuttles and providing comfortable bus stops. Moreover, covered sidewalks are also provided, with more green plants grown to encourage students to walk. Gardens, parks, and ponds are specially designed and provided in campuses; these do not only refine the air and produce oxygen, but also provide a good habitat for different species and help biodiversity. These universities have also planted trees and

plants, and this effort has led to the formation of unique flora and fauna aimed at using indigenous plantation and sustainable landscape. Moreover, the communication between campus users is sternly done via electronic, whereas most of the communications, from students to lecturers and staff (and vice versa), are done through email. The assessment system and students' marks are done through the electronic portal which reduces the use of a lot of paper and thus helps conserve the environment. Every university has provided other facilities such as electronic system for campus users to transfer funds, pay tuition fees, water and electricity bills, purchase their daily necessities like telephone top up, books, etc.

OUTREACH AND SERVICES

University Malaya

UM is among the local universities which offers distance learning programmes, such as Masters of Bio-safety which transcends the borders of the campus (UM, 2008). It also offers part-time programmes for those in the working community such as the Bachelor of Business and Administration and career development programmes like "Current Labour Issues and Solutions" (UMCCED, 2009).

Collaborating with the other overseas universities in doing their collaborative research on sustainability (e.g. "Energy Research Group" with University of Southampton) is also an indicator to prove the tendency of UM towards sustainability (Energy Research Group, 2008).

Events pertaining to sustainability have also been held, such as World Environment Day, Rain Forest and Our Environment Exhibition, Earth Day, Green Day, Workshops on Problem-Based Learning in Environmental Education, and Hari Kesedaran Alam Sekitar (Azizan, 2005). In addition, UM also has a partnership with WWF Malaysia, and NGO, in Educational Environment (EE) (Daniel and Nadeson, 2006).

Universiti Kebangsaan Malaysia

UKM offers a variety of part-time programmes for the working community such as Environmental

Management (UKM, 2008). There are also several collaborative research works with overseas universities on sustainability. For instance, UKM has collaborations with Mahidol University (MU) and Chulalongkorn University in Thailand, Aalborg University (AAU) in Denmark, and Berlage Institute in the Netherland (Hansen and Lehmann, 2006). Consecutively, "ASEAN-EU" University Network Programme allocated the universities with grants for curriculum development to establish a new programme, i.e. Masters in Urban Quality Development and Management (ibid). UKM community outreach also embarked to initiate projects for the villagers of Kundang Hulu in Johore, including studies on flood mitigation (Shahabuddin, 2008). This University also has a partnership with WWF Malaysia, and NGO, in Educational Environment (EE) (Daniel and Nadeson, 2006).

Universiti Sains Malaysia

USM also offers part-time programs for the working community, as well as distance learning in various aspects of sustainability, such as Bachelor in Social Science and Master of Environmental Management (USM, 2008). In addition, USM has a centre for distance learning, i.e. School of Distance Education (SDE). She has had an influential role on Penang Island through conducting various workshops for the local authorities and multidisciplinary research. Professor Tan Sri Dato' Dzulkipli Abd Razak, the Vice Chancellor of USM has personally initiated a new technique to have more outreach and services to the Malaysian community, i.e. by publishing a series of articles in a very simple and understandable manner in their website, addressing a combination of sustainability and hot news given under "Views and Comments." The articles vary from environmental sustainability, like his articles entitled, '*Squandering green opportunities to social aspects and economic aspects such as inconsistent, insensitive translations of Allah*' and '*Coming together for tomorrow*' (USM, 2009). USM also has a partnership with WWF

Malaysia, and NGO, in Educational Environment (EE) (Daniel and Nadeson, 2006).

Universiti Putra Malaysia

UPM also offers part-time programmes, such as Masters of Environmental Studies and distance learning programs for the working community. Moreover, UPM has an institute known as the Institute for Distance Education and Learning (IDEAL).

The university has organized workshops, seminars, and lectures, which indirectly or directly are addressing the concept of sustainability such as the workshops for senior citizens, for both the public and the university students. In addition, there have been several collaborations with the external community, so as to motivate more a sustainable life like the collaboration with University Malaysia Sabah to improve the livelihood in Kota Marudu and encourage a sustainable management for shoreline and fisheries (UPM, 2009). Moreover, UPM also has partnerships with WWF Malaysia and other NGOs, in Educational Environment (EE) (Daniel and Nadeson, 2006).

SUMMARY AND CONCLUSION

In relation to the initiatives made by these world-class universities on sustainability, it was found that SHE encompasses five main rubrics; these are 1) Sustainability in Policy, Planning and Administration; 2) Sustainable Courses and Curricula; 3) Sustainable Research and Scholarship; 4) Sustainable Operation; and 5) Sustainable Outreach and Services. It is also important to note that the concept of SHE has already been recognized by the top managers of the four research universities, and that all of these universities have already embarked in moving towards the SHE. However, there are still deficiencies which should be given due considerations by these universities in order to catch up with the first-world countries. In this study, the selected universities were found to have started the efforts of varying degrees on sustainability. For example, one university has

shown its high commitment in policy, mission, while another university has shown strong efforts in its operation. Although making an accurate comparison is not in the scope of this paper, it can be stated that University Sains Malaysia has taken the highest initiatives in all the five aspects based on the initial observations, but UKM is strong in the first issue by having different active organizations such as LESTARI and SGK. Meanwhile, UPM has taken good initiatives in operations such as providing bicycle lanes, recycling bins and having different religious praying houses. Similarly, UM has had good outreach and services by having partnerships with various organizations. Nevertheless, there is still a need to develop or adapt a local assessment tool and formulate a strong multidisciplinary research team to make a comprehensive and accurate comparison among the four selected universities. In terms of sustainable operation, it seems that private transportation still poses a major issue which needs to be addressed by these universities.

Thus, it can be concluded that as far as SHE intentions and effects are concerned, the four research universities (UM, USM, UKM, UPM) are positive parties with varying degrees of commitment and success. However, these universities still have a long way to go to be at par with their counterparts, particularly the western universities, in addressing all the issues pertaining to SHE.

SCOPE AND LIMITATION OF THE STUDY

The study attempted to provide evidences which could be used to prove that Malaysian universities have already understood SHE and stepped forward in this global movement. Besides, there has been no claim stating that these five rubrics function as a comprehensive tool to measure the universities in terms of sustainability. It solely gives some insights on important on-going sustainable rubrics and initiatives in the universities. Similarly, there has been no intention to compare these four universities, as a suitable assessment tool

and a strong multidisciplinary research team are required to measure Malaysian campus sustainability which has yet to be adapted.

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