PROMOTING CAMPUS SUSTAINABILITY: A CONCEPTUAL FRAMEWORK FOR THE ASSESSMENT OF CAMPUS SUSTAINABILITY

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ABSTRACT

Campus sustainability is an effort taken by universities almost throughout the world to ensure mutual prosperity in the future. Similarly, Universiti Kebangsaan Malaysia (UKM) has initiated efforts to achieve a sustainable campus at the university level. This article aims to develop a framework for a manual on campus sustainability assessment suitable for UKM. This framework will be developed based on several well-known sustainability frameworks such as the Campus Sustainability Assessment Framework (CSAF), Sustainability Tracking Assessment and Rating System (STARS), Green Matrix UPSI, and Sustainable UKM. These frameworks include various types of assessment elements, its sub-elements, and indicators. Meanwhile, based on the results of previous studies, the researchers have developed a more concise framework for assessing the elements of sustainability in UKM in terms of economy, design, and social. This framework includes three main elements and seven sub-elements of Economy (energy management, water management, waste management), Design (infrastructure and facilities, transportation), and Social (landscape and recreation, and safety). This framework can be used to assess whether the facilities or services provided on the UKM campus ensures sustainability. Furthermore, a survey was conducted to test the knowledge and practice of campus sustainability as a part of the formation of this assessment manual.

Keywords – Campus sustainability, assessment framework, sustainable campus, development of a sustainability assessment manual

INTRODUCTION

The term sustainability can be defined as a measure to overcome the needs of the present without compromising the ability and interests of the future generation (University, 2010). Meanwhile,

the concept of campus sustainability is a strategy for the improvement of sustainable practices on campus to raise awareness among students and staff on sustainability and related issues. Furthermore, various initiatives have been taken to implement the concept of sustainability at the university level. For example, at the national level, Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM), and Universiti Putra Malaysia (UPM) have begun campus sustainability initiatives. The Talloires Declaration was signed in 2010 by 413 universities from around the world including Universiti Kebangsaan Malaysia (UKM) compared to the beginning when this declaration was only signed by 22 universities in 1990. The main aim of the declaration is the efforts of the universities to implement the idea of sustainability in the respective university management (Norfadillah Derahmin, 2011).

Furthermore, university students are future graduates and leaders of a nation (Cole, 2003). The university was chosen as the ideal place to apply the concept of sustainability as the students will return to the communities and serve them, and they can apply the concept in their respective communities. In addition, the university encompasses a large area occupied by a high population density that is equipped with roads, buildings, laboratories, cafeteria, and other facilities. Therefore, sustainable management is very important in the campus area to ensure that all the currently available resources can be utilized with care without compromising the interests of the future generation.

BACKGROUND OF THE SUSTAINABLE UKM

Universiti Kebangsaan Malaysia (UKM) has made efforts to apply the concept of sustainability in the management of the campus with the formation of the Institute for Environment and Development (LESTARI) in 1994. UKM's commitment to sustainability has been continued through the launch of the 2007 SUSTAINABILITY program and the Sustainable UKM Charter. The main purpose of the launch is the effort of UKM to coordinate the sustainability management in the entire campus. Furthermore, the principles of a sustainable development in UKM were developed based on the 1992 Rio Principles, Agenda 21, the 2002 Johannesburg sustainability implication plans, the framework developed in Malaysia such as Vision 2020, and other principles. The six sustainability principles of UKM are as follows:

I.   Display institutional practices that promote sustainability and give preference to university suppliers who practice sustainability;

II.   Improve community well-being and productivity;

III.   Improve the health of the campus ecosystems;

IV.   Promote environmental research and development of institutions in the aspect of sustainability;

V.   Develop planning tools to support responsible decision-making; and

VI.   Utilize sustainability indicators to monitor, report, and improve sustainability on an ongoing basis.

UKM has its own sustainable development objectives, namely to:

I.   Conserve and manage the resources and water supply so that it is sufficient and of quality;

II.   Manage energy usage that is efficient and sustainable;

III.   Implement an effective solid waste management;

IV.   Establish the identity of UKM in civic building designs;

V.   Create an identifiable landscape;

VI.   Improve the effectiveness and accessibility of public transport;

VII.   Enhance the quality of life of the campus community; and

VIII. Improve the awareness of the campus community about sustainable living.

(Source: Principles and Objectives of sustainable UKM was retrieved from the Main Physical Development Plans of UKM Bangi Campus, 2007-2020)

Meanwhile, the sustainable UKM component has three key elements in the development of a sustainable UKM campus namely Equity, Economy, and Design (Zuhairuse Md Darus, 2009). Each of these elements has a number of sub-elements as follows:
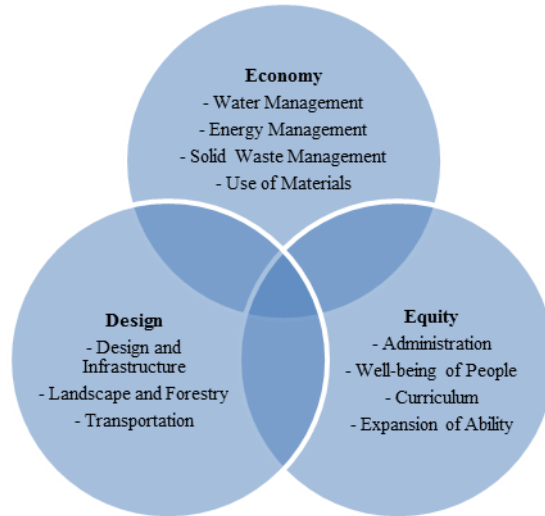
Figure 1: The main componens in development od Sustainable campus at UKM

RESEARCH METHODOLOGY

This article aims to discuss the development of a conceptual framework to assess campus sustainability.

The conceptual framework is developed based on the literature review of the Campus Sustainability Model CSAF, STAR, Green Matrix, Sustainable UKM, and subsequently modified to suit the application in the context of Malaysia (see Figure 1). Following this, a questionnaire was developed which included questions related to the respondents' demography as well as to assess the knowledge and practices of campus sustainability (Appendix 1).

Conceptual Framework For Assessment Of Campus Sustainability

The importance of preserving and conserving the environment in the process of rapid development is the driving factor for universities around the world to propose initiatives to sustain the campus.

This framework was developed based on several available frameworks and reference materials such as the CSAF, STARS, Green Matrix (UPSI), and Sustainable UKM. According to

the researchers' literature review, the CSAF and STARS prioritize certain elements for deep assessment of sustainability and are not suitable to be used in our country. As such, this framework developed by the researchers only includes three major elements and seven sub-elements that were selected and modified from the listed reference materials. The three main elements are namely economy, design, and social while the sub-elements include energy management, water management, waste management, infrastructure and facilities, transportation, landscape and recreation, and safety. Figure 2 demonstrates the assessment framework for UKM's campus sustainability. Meanwhile, the criteria that will be emphasized as well as the units of measurement are attached as Appendix 2.
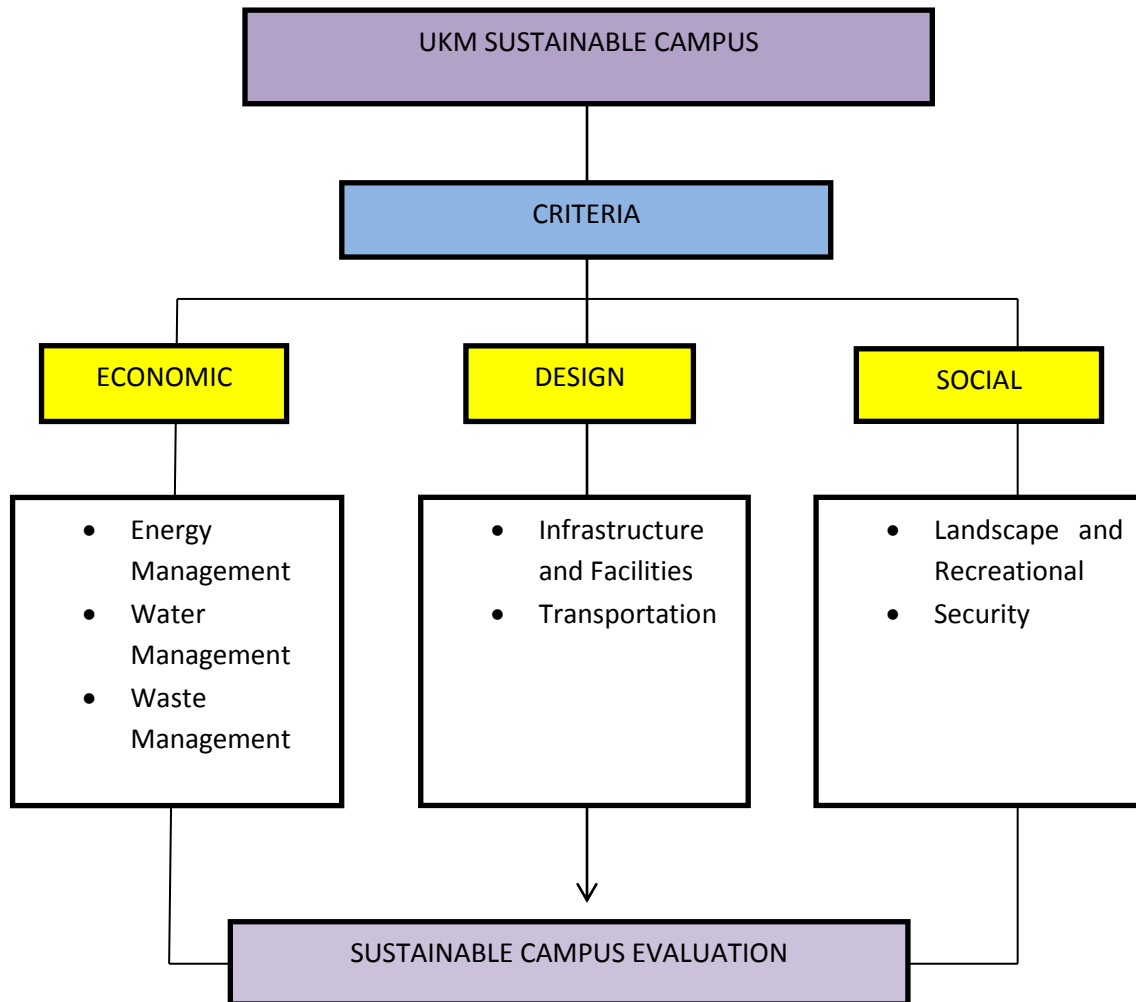

Figure 2: The Framework for UKM's Sustainable Campus

Sustainability Literature From Abroad

Nixon (2002) discussed the process used in CSARP to determine the initial guidelines for campus sustainability assessment. The main motive of this project is to study and give a review of the project and the existing campus sustainability tools in North America and Europe. Furthermore, the project also gathered all the best methods to develop the assessment guidelines. This project is broad, comprehensive, highly analytical, and beneficial. In addition, the project includes all the categories, particularly humans and ecosystems. However, the research was not done based on the critique of the current gaps in the development of the tools and techniques but it was done based on the existing resources. In addition, the project has not been tested and is still under development (Cole, 2003).

Consecutively, the Penn State Indicators Report was conducted by the Penn State Green Destiny Council of the Pennsylvania State University in 2000 (Council, 2000). This study included 33 types of campus sustainability indicators and assessed each one with a value of four points. This report is a more comprehensive campus sustainability report issued by the North American campus. The report was well written to highlight the work that was done by the campus interest groups. Every indicator discussed the issue, the reaction level, causes, best practices from other campuses as well as short and long-term proposals to improve the situation at Penn State. In fact, the only drawback was that the report still did not cover all the aspects of sustainability and indicators and the reaction criteria was not described clearly and in detail.

In 2003, Lindsay Cole conducted a study entitled "*Assessing sustainability on Canadian University Campuses: Development of a Campus Sustainability Assessment Framework (CSAF)*". The CSAF assists the campus to assess various sustainability issues. In this study, Cole raised seven criteria such as the tools used must provide useful results, the developed tools must be clear, the developed tools should be applicable, and so on. The final result of this study was able to develop 175 indicators (Cole, 2003). However, this study also has a disadvantage, which is that the framework was built in depth in terms of setting benchmarks, the selection of indicators, and to aggregate the performance scores in the index (Clarke, 2012). Therefore, this led to a partisan issue, namely the consumers and the audience did not clearly understand. Next,

a study entitled "*Indicators, domains, and scoring for a Canadian Community Sustainability Indicator Framework*" was carried out by Allan Taylor from the Waterloo University (Taylor, 2012).

A study was also carried out by a student named Elizabeth Bang from the Queen's University, Canada. The title of her research is *The Sustainability Campus: A Comparison of Comprehensive Sustainability Policies in the Campus Master Plans of the University of Guelph and Queen's University* (Bang, 2015). The main purpose of this study was to access the proposed policies of a sustainable campus as stated in the Campus Master Plan (CMP) of the University of Guelph and the Queen's University. In this study, the researchers highlighted two issues, which are to compare the universities' CMP to find out which one provides a more concise collection of sustainable campus policies. This study used several approaches; the first one was focused on the CMP document from both universities along with several semi-structured interviews. At the same time, the study was conducted based on several sustainability themes, namely academic, participation, operations, planning, and administration.

Review Of Local Research

In 2010, a study was conducted in UKM entitled the Sustainability Level of Universiti Kebangsaan Malaysia Students towards a Sustainable Campus (Norfadillah Derahim, 2011). The study was carried out in general whereby 2275 UKM citizens were selected using the stratified random sampling method based on the type of faculty. The study used a questionnaire with 20 questions. This study was conducted by Miss Norfadillah Derahim, Datin Paduka Dr. Halimaton Saadiah Hashim, and Assoc. Prof. Datin Noraziah Ali of UKM.

Meanwhile, a study entitled "Identifying the Strength and Weakness of Sustainable Higher Education Assessment Approaches" was carried out at Universiti Putra Malaysia (UPM), (Omidreza Saadatian, 2011). The main objective of this study was to evaluate the approaches of the Sustainable Higher Educational Assessment (SHE), which is quite well known in terms of strengths and weaknesses. To assess the scale of assessment, two theories and three criteria were established, namely the theory of the "*Triple Bottom Line*" (TBL), and the Theory of "Avoiding

Subjective Judgement", as well as the Criterion of Comprehensive, the Criterion of Novelty, and the Criterion of Popularity.

The approach of this study was to examine the documents related to the SHE assessment approach, to perform a content analysis, and interview sessions were also held with experts or sustainability program coordinators from selected overseas universities.

Furthermore, a study was also conducted in Universiti Kebangsaan Malaysia (UKM), entitled "UKM Staff's Perspective on Sustainability and its Contribution towards a Sustainable University" (Norfadillah Derahim, 2012). The study was conducted in the campus, especially to study the perspective of the staff of UKM on sustainability and contribution towards a Sustainable University. A total of 425 respondents were selected from among the staff through a random sample selection technique and questionnaires were distributed.

Meanwhile, a study was conducted at Universiti Pendidikan Sultan Idris (UPSI) to assess the green campus level, according to an article entitled "Development of a Sustainable Campus Landscape Criteria: An Evaluation of Universiti Pendidikan Sultan Idris as a Green Campus" (Rosa Malinda Mahayudin, 2015). The assessment of the UPSI landscape involved a theoretical framework comprising three elements, namely Environmental, Social, and Economy with guidelines as well.
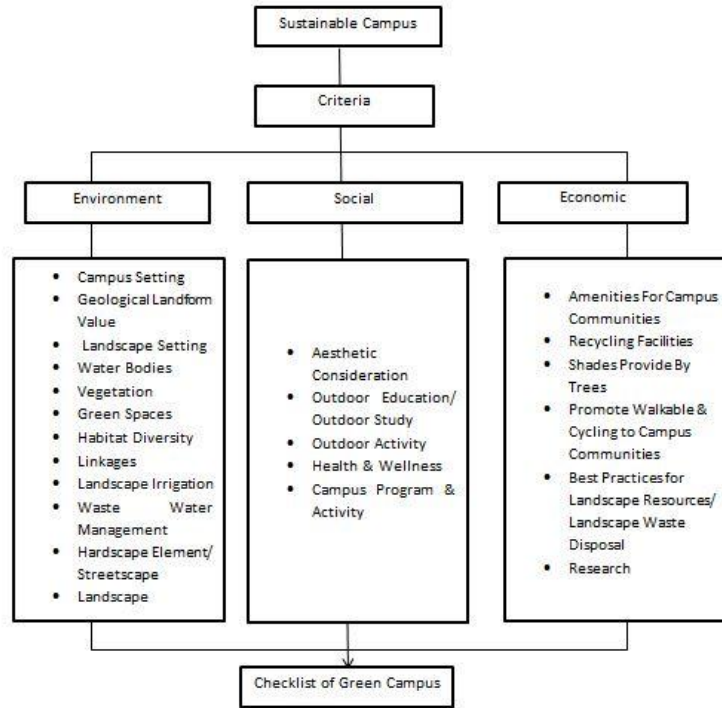
Figure 3: Framework for the greenery assessment of the UPSI campus (Rosa Malinda Mahayudin, 2015)

All the elements were given scores as follows, namely Environmental 50 percent, Social 25 percent, and Economy 25 percent. Figure 4 below shows a list of the criteria that were taken into consideration in the assessment of the greenery of the UPSI campus. The total assessment scores were used to determine the percentage category of the green campus as follows:

Category of Green Campus	Total (%)
Gold	100%-80%
Silver	79% - 50%
Certified	49% - 30%

NO	CRITERIA	INDICATOR	√ IF APPLICABLE ON SITE	TOTAL POINT	PERCENTAGE (%)
	SUSTAINABLE CAMPUS LANDSCAPE CRITERIA: CHECK LIST TO EVALUATE UPSI AS A GREEN CAMPUS				
A	ENVIRONMENT			40	50%
1	Campus Setting	Rural			
		Suburban			
		Urban			
2	Geological/Landform value	Closed to Mount or *Banjaran*			
		Topography/landform flat/slope			
		Remain Landform			
3	Landscape Setting	20% of area on campus covered in vegetation in the form of forest.			
		20% of area on campus covered in planted vegetation (include lawns, gardens, green roofs, internal planting			
4	Water Bodies	Retention Pond		/40	
		Water features/water fountain or water element			
		River			
5	Vegetation	Matured Trees 80%			
		Diversity of plants			
		Canopy Shade/tree can significantly reduce storm water runoff			
		Native Plants- conserve water			
		Air quality and climate benefit			
6	Green spaces	Green field			
		Lawn			
		Recreational green space			
		Garden			
		Pocket Garden			
7	Habitat Diversity/Benefit	Natural area provide living space for variety of animal species			
		A habitat is a home environment which provides the natural conditions / environment for a plant or animal to live			
8	Linkages	Pathway/walkway			
		Cycle Track/Path			
9	Landscape Irrigation	Rain Harvesting System			
		Reuse recycle water from storm or Gray water			
		Rain Garden			
		Retention Pond			
10	Waste Water Management	Flood Water Management			
		Storm Water Management			
		Gray Water Management			
11	Hardscape Element/Streetscape	Seating and Benches			
		Directional Signage			
		Gazebo			
		Lighting			
		Sculpture			
		Bollard			
12	Landscape Management Plan & Maintenance Plan	Maintenance Schedule			
		Management Plan			
B	SOCIAL			12	25%
1	Aesthetic consideration	An aesthetically pleasing campus garden and landscape			
2	Outdoor education/outdoor study	Garden			
		Pocket garden			
3	Outdoor Activity	Meeting			
		Gathering Point		/12	
4	Health & Wellness Area	Reflexology path			
		Jogging Track			
		Par course Station			
		Outdoor Gym Station			
5	Campus Program & Activity	Earth Day Campaign			
		Tree planting Program			
		Earth Hour Campaign			
C	ECONOMIC			13	25%
1	Amenities for campus communities	Bank			
		Food Kiosk			
		Cafe			
		Convenience Shop			
2	Recycling Facilities	Recycle Disposal Station			
		A Recycling Program			
3	Shade Provided by Trees	Cool the campus area		/13	
		Bring shade to the pedestrian/users (student, staff and maintenance workers)			
4	Promote walk able and cycling to campus communities	Reduce carbon emissions			
		Protect the environment from pollution			
5	Best Practice for Landscape resources/Landscape waste disposal	Compost dry leaves can return the soil nutrient			
		Reuse Sewerage Water Treatment Plant for landscape purposes and toilet purposes			
6	Research and development	Serve as living labs for collaborative research by student, staff and faculty			
	TOTAL POINT			/65	/100%

Figure 4: The list of the evaluation criteria of greenery at the UPSI campus

Meanwhile, UPSI obtained a total score of 80.31 percent. Figure 5 shows the evaluation results of the greenery level of the UPSI campus where the environmental element was 36.25 percent, social 22.91 percent, and economy was at 21.15 percent.
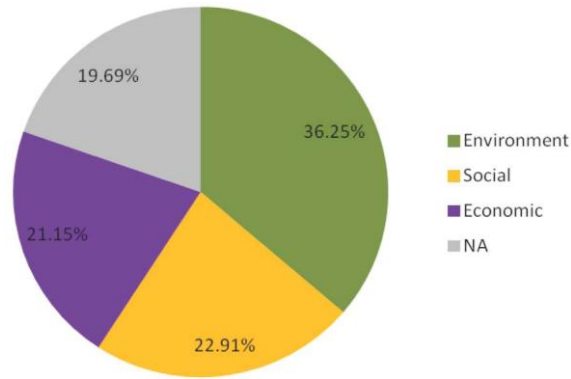
Figure 5: Green UPSI Evaluation Result

According to an article entitled "Exploring Strategies for Sustainable 'EcoCampus': The Experience of Universiti Malaysia Sabah" (Velan Kunjuraman, 2015), the author discussed the strategy and approach of local and foreign universities in order to establish a sustainable campus. At the same time, the author used secondary data to obtain information related to the strategies used by various universities. The findings discussed in the article are Universiti Malaysia Sabah's (UMS) strategies towards campus sustainability. UMS defined 'Eco-Campus Management' as a reference center that acts as the caretaker of the environment, contributing to global sustainability efforts by introducing excellence in teaching and learning, research, infrastructure development, environmental management and operations as well as all campus related issues. Furthermore, the Eco-Campus also allows the institutions to identify, evaluate, manage, and improve the environment practically and systematically. The UMS Eco-Campus has absorbed the idea of sustainability in the management of UMS namely:

Figure 6: The main value of the Eco-Campus

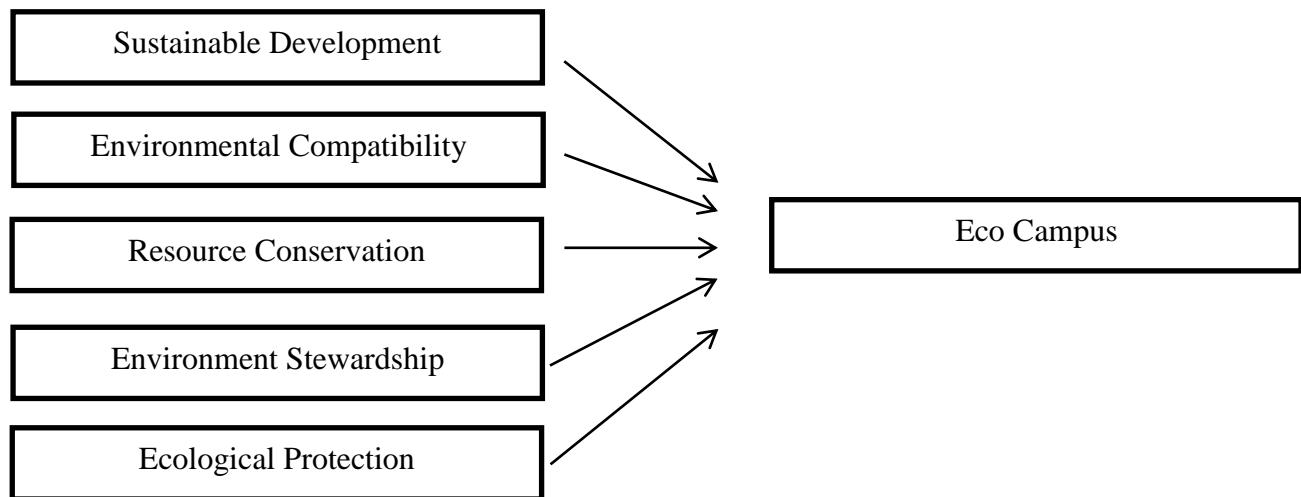The literature review formed the basis for the development of a conceptual framework that can be used to assess campus sustainability, as shown in Figure 6.

CONCLUSION

The conceptual framework that was developed can be applied to assess the level of understanding and practice of sustainability among the community of FSSK and to assess the sustainability level of the university as a whole. Furthermore, the results of this study will enable UKM to improve the level of campus infrastructure based on the motive of sustainability. In addition, the sustainability of the campus will be evaluated based on the guideline of a matrix suitable to be used in UKM. Besides that, a research framework will be developed to assess the sustainability of the campus and the result of the framework can be used by other local universities. The conceptual framework can then be used to develop a manual for the assessment of campus sustainability. The campus sustainability assessment will give a positive impact to the entire campus community, the local community, and subsequently at the national and international levels in the effort to preserve and conserve the natural resources.

Acknowledgement

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LAMPIRAN 1

> **SET 2 : STUDENT**

UNIVERSITI KEBANGSAAN MALAYSIA

The National University of Malaysia

FAKULTI SAINS SOSIAL DAN KEMANUSIAN (FSSK)

SURVEY FORM /BORANG SOAL SELIDIK

PROJEK PENYELIDIKAN PEMBENTUKAN MANUAL PENILAIAN KELESTARIAN KAMPUS (AP-2014-022) di bawah kepimpinan PROF. DR. ER AH CHOY

TAJUK THESIS: TAHAP KEFAHAMAN DAN AMALAN WARGA FSSK TERHADAP KELESTARIAN KAMPUS, UKM
(UNDERSTANDING AND PRACTICES OF FSSK COMMUNITY TOWARDS SUSTAINABLE CAMPUS, UKM)

Soal Selidik ini diadakan bagi memperoleh data dan maklumat mengenai tahap kefahaman kelestarian dan amalam warga FSSK untuk menyiapkan tesis Sarjana Pengurusan Persekitaran saya. Saya sangat berbesar hati kepada responden kerana dapat meluangkan masa untuk memberi maklum balas, pandangan, dan cadangan tentang borang soal selidik ini. Untuk pengetahuan anda , maklumat yang diperolehi daripada soal selidik ini adalah **SULIT** dan maklumat ini akan digunakan bagi tujuan akademik sahaja. Kerjasama anda amat dihargai dan saya mendahului dengan ribuan ucapan terima kasih.

SECTION A (SEKSYEN A) : RESPONDENT BACKGROUND (LATAR BELAKANG RESPONDEN)
Please tick [/] your answers. (Sila tandakan [/] jawapan anda)

1) Role in UKM   [ ] Undergraduate (Pra –Siswazah)
   (Peranan di UKM)   [ ] Postgraduate (Siswazah)
                                   Study Year(Tahun Pengajian) : 1/2/3/4

2) School   [ ] School of Media Communication (Pusat Pengajian Media
   (Pusat Pengajian)   dan Komunikasi)
                            [ ] School of Social Development and Environmental Studies
                               (Pusat Pengajian Sosial, Pembagunan dan Persekitaran)
                            [ ] School of Language Studies and Linguistic (Pusat
                               Pengajian Bahasa dan Linguistik)
                            [ ] School of History, Politics & Strategic Studies(Pusat
                               Pengajian Sejarah, Politik dan Strategi)
                            [ ] School of Malay Language, Literature and Culture Studies
                               (Pusat Pengajian Bahasa, Kesusasteraan dan
                               Kebudayaan Melayu)
                            [ ] School of Psychology and Human Development (Pusat
                               Pengajian Psikologi dan Pembangunan Manusia)
                            [ ]Deanery Office (Pejabat Dekan)
                            [ ]Other.Please State(Lain-lain.Sila Nyatakan):……………………

3) Nationality   [ ] Malaysian (Malaysia)
   (Warganegara)   [ ] Non – Malaysian (Bukan Malaysia)

4) Age (Umur)   [ ] 18 years -30 years   (20 tahun -30 tahun)
                            [ ] 31 years- 40years   (31 tahun - 40 tahun)
                            [ ] 41 years and above (41 tahun dan keatas)

5) Gender (Jantina)   [ ] Female (Perempuan) [ ] Male (Lelaki)

6) Living   [ ] In Campus (Dalam kampus)
   Place(Kediaman)   [ ] Outside Campus (Luar kampus)

7) Education Level [ ] PMR/SPM/STPM/Diploma [ ] Degree (Sarjana Muda)
   (Tahap Pendidikan [ ] Master (Sarjana)   [ ] PhD

Tertinggi)

SECTION B (SEKSYEN B): UNDERSTANDING ON CAMPUS SUSTAINABLITY (KEFAHAMAN KELESTARIAN KAMPUS)

Please tick [/] your answers. Please choose **ONLY ONE** option (Sila tandakan [/] jawapan anda. Sila memilih **SATU** jawapan sahaja)

1) What do you understand about campus sustainability? (Apakah anda faham tentang kelestarian kampus?)

[   ] Reuse all resources in campus (Guna semula setiap sumber yang sedia ada di kampus)

[   ] A strategy to improve sustainable performances with University (Konsep menambahbaikan amalan kelestarian di kampus)

[   ] A concept to increase awareness among employees and students about sustainability   (Konsep bagi meningkatkan kesedaran dalam kalangan kakitangan dan pelajar tentang kelestarian)

[   ] Collaboration among campus community (students, employees, management) towards a safe environment from pollution (Kerjasama antara komuniti kampus (pelajar, kakitangan , pihak pengurusan) terhadap alam sekitar yang sihat bebas pencemaran)

[   ] Others. Please State (Lain-lain. Sila Nyatakan): ……………………………………..

……………………………………………………………………………………………………

2) Do you know that UKM have introduced "campus sustainability"? (Adakah anda tahu bahawa UKM telah memperkenalkan "Kampus Lestari"?)

[   ] Yes/ Ya   *(Please go to Question 3-8/ Sila jawab soalan 3-8)*

[   ] No/ Tidak *(Please go TO SECTION C/ Sila jawab soalan SEKSYEN C)*

3) Are you aware of the following issues which are related to campus sustainability? (Adakah anda mempunyai kesedaran terhadap isu-isu berkaitan dengan kampus lestari seperti berikut?

	Yes (Ya)	No (Tidak)	Not Sure (Tidak Pasti)
Do you know about Talloires' Declaration (Adakah anda Tahu tentang *"Talloire's Declaration"*) (*A declaration to define and promote sustainability in higher education which was made in October 1990 at Talloires, France*)			
Do you know about Piagam Lestari UKM 2007 (Adakah anda tahu tentang Piagam Lestari UKM 2007 ?) (*UKM launched a Sustainable UKM charter with the theme "Sustainable UKM for Malaysia & World' to fulfill the full integration of sustainable developing practice in university by 2020*)			
Do you know about the Principles of Sustainable Development at UKM (Adakah anda tahu tentang prinsip pembangunan Lestari di UKM) (*The principles at UKM is developed base on the concept being practice globally and accredited at international level included the Rio principle 1992 , Agenda 21 implementation plan for sustainability*)			
UKM have 3 main components in the development of sustainable campus at UKM such as Equity, Economy and Design. Do you know about these components? (UKM mempunyai tiga komponen utama dalam pembangunan kampus lestari seperti *Equity*, Ekonomi, dan reka bentuk. Adakah anda tahu tentang komponen tersebut?)			

4) What are the initiatives that UKM is doing to support campus sustainability among campus community? (Apakah inisiatif –inisiatif yang ambil oleh UKM bagi menyokong kampus lestari dalam kalangan komuniti kampus?)
[   ] Awareness campaign/ Seminar (Kempen/ Seminar Kesedaran)
[   ] Sustainable Education Syllabus (Subjek Kelestarian dalam Sylabus)
[   ] Research Funds for sustainable researches (Dana bagi penyelidikan kelestarian)
[   ] Sustainable rules and regulation around campus (Peraturan dan undang-undang kelestarian di seluruh kampus)
[   ] Other Please State(Lain-lain. Sila Nyatakan): …………………………………………

5) How do you monitor all the sustainable progress related exposures such as information, program details in UKM? (Bagaimanakah anda mengawasi isu-isu semasa berkaitan kelestarian kampus seperti maklumat, informasi program di UKM ?)
[ ] UKM Newsletter (Daily/ Weekly/ Monthly/ Year)
    (Penerbitan UKM (Harian / Mingguan/ Bulanan /Tahunan))
[ ] Website. Please State (Laman Sesawang. Sila nyatakan) :…………………………….)
[ ] Announcement Board (Papan kenyataan)
[ ] Social Media (Ex: Facebook, Twitter) (Media sosial (Cth: Facebook, Twitter))
[ ] Other. Please State (Lain-lain. Sila Nyatakan) :…………………………………….

6) Would you like to participate / practice campus sustainability in the campus? (Adakah anda minat menyertai/ mengamalkan konsep kelestarian kampus dalam kampus?)
[ ] Yes/Ya   *(If Yes please go to question 7/Sila jawab soalan 7)*
[ ] No/ Tidak (Please state why/ Sila nyatakan sebab: …………………………………….)

7) Why do you like to participate in campus sustainability programs?(Kenapa anda minat menyertai program kelestarian kampus?)
[ ] Compulsory requirement at UKM (Keperluan wajib di UKM)
[ ] Encourage by friend/colleagues (Digalak oleh kawan/ rakan sekerja)
[ ] Get merit points (Mendapat markah merit)
[ ] I know my role in sustainable campus concept(Saya tahu peranan saya dalam kampus lestari)
[ ] Others Please state (Lain-lain. Sila nyatakan):………………………………………

8) Do you share your sustainable knowledge you gain at campus with society outside the campus? (Adakah anda kongsikan ilmu kelestarian kampus dengan masyarkat luar kampus?)

[   ] Yes/ Ya *(Please state how do you share your knowledge pertaining to sustainability with others/ Sila nyatakan bagaimana anda kongsi ilmu berkaitan dengan kelestarian masyarkat luar kampu*s :
……………………………………………………………………………………….

[   ]   No/Tidak (Please   state   why/   Sila   nyatakan   sebab):
…………………………………………………….

SECTION C(SEKSYEN C): SUSTAINABLE PRACTICES IN CAMPUS (AMALAN KELESTARIAN DI KAMPUS)

Please tick [/]   your answers. Please choose <u>ONLY ONE</u> option. (Sila tandakan [/] jawapan anda. Sila pilih <u>SATU</u> jawapan sahaja)

EKONOMI (ECONOMICS)

a. ENERGY MANAGEMENT (PENGURUSAN TENAGA)

1) Do you know the importance of energy management in the campus? (Adakah anda tahu tentang kepentingan pengurusan tenaga dalam kampus?)

[   ] Yes (Ya)   [   ] No (Tidak)

2) How do you practice energy savings at home/office/classroom? (Bagaimanakah anda menjimatkan tenaga di rumah/pejabat/ bilik kuliah?)

Please answer questions below by using the following scale, tick (V) your answer: (5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree (Sila jawab soalan di bawah dengan menggunakan skala berikut , tandakan (√) jawapan anda: (5) Sangat Setuju (4) Setuju (3) Neutral (2) Tidak setuju (1) Sangat Tidak Setuju)

	5	4	3	2	1
Switch off power supply when not in use (Matikan bekalan elektrik semasa tidak digunakan)					
Always make sure lights are turn off before leaving the room (Sentiasa memastikan padam semua lampu sebelum meninggalkan bilik)					
Switch on the washing machines after a full load (Mulakan mesin basuh selepas dimuat penuh)					
Leaving laptop in power safe mode when not in use (Meninggalkan komputer riba dalam keadaan *"Safe mode"* jika tidak diguna)					
Use motion detector lights in house (Menggunakan lampu mengesan pergerakan automatik di rumah)					

3) Do you paying your monthly electric bills? (Adakah anda membayar bil bulanan elektrik?)
   [ ] Yes / Ya – *(Please go to question 4/ Sila jawab soalan 4)*
   [   ] No/ TIdak (Please state Why /Sila nyatakan sebab: ……………………………………………………………………)

4) How much do you spend for your electricity bill per month? (Berapakah jumlah yang anda bayar bagi bil bulanan elektrik?)
   [ ] Below RM 20 (Kurang daripada RM 20)
   [ ] RM 20- RM 50

[   ] RM 51- RM 100
[   ] RM 101 & Above(RM 101 & Keatas)

b.   WATER MANAGEMENT (PENGURUSAN AIR)

5) Do you think water management in UKM campus are good enough?(Adakah di kampus UKM mempunyai pengurusan air yang baik?)
    [ ] Yes/Ya   [   ]No/Tidak   [   ]Not Sure/Tidak pasti

6) Do you practice these activities in your daily life? (Adakah anda mengamalan aktiviti berikut dalam kehidupan harian anda?)

    Please answer questions below by using the following scale, tick (v) your answer: (5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree *(Sila jawab soalan di bawah dengan menggunakan skala berikut , tandakan (v) jawapan anda: (5) Sangat Setuju (4) Setuju (3) Neutral (2) Tidak setuju (1) Sangat Tidak Setuju)*

	5	4	3	2	1
Report the water leakages (Melaporkan kebocoran air)					
Turn off the pipe when brush the teeth and apply shampoo (Tutup paip semasa memberus gigi dan pakai syampu)					
Start washing machine after full loaded (Mulakan mesin basuh setelah dimuat penuh)					
Flushing the toilet unnecessarily (Waste a lot of water)					
Take short showers (Mandian yang tidak lama)					

c. WASTE MANAGEMENT (PENGURUSAN SISA)

7) Do you practice these activities to contribute to proper waste management? (Adakah anda mengamalkan aktiviti berikut bagi menyokong pengurusan sisa yang baik?)

Please answer questions below by using the following scale, tick (√) your answer: (5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree *(Sila jawab soalan di bawah dengan menggunakan skala berikut , tandakan (√) jawapan anda: (5) Sangat Setuju (4) Setuju (3) Neutral (2) Tidak setuju (1) Sangat Tidak Setuju)*

	5	4	3	2	1
Recycling of used goods such as plastic bottles, bottles, clothing, books (Kitar semula barang-barang seperti botol plastik, botol kaca, baju, buku)					
Bring own food container to cafe (Membawa bekas makanan sendiri ke kafeteria)					
Encourage recycling products such as furniture, papers and household things (Menyokong produk kitar semula seperti perabot, kertas dan barang keperluan rumah)					
Print documents double-sided(reduce paper waste) (Cetak dokumen dalam kedua –dua muka surat(Mengurangkan sisa kertas))					
Prefer digitalization(use email instead of letter, digital receipt, soft copy instead of hard copy) (Mengamalkan *digitilzation* (mengunakan E-mail mengantikan surat, resit digital))					

Do you know about e-waste (computer, printer, phones, laptop and all kind of

8) electronic gadgets)? (Adakah anda tahu tentang *"e-waste"*(semua jenis alat elektrik dan elektronik seperti komputer))

[ ] Yes (Ya)   [ ] No(Tidak)   [ ] Not Sure (Tidak Pasti)

If Yes please answer following question (Jika Ya sila jawab soalan yang berikut)

How do you dispose "e- WASTE"? (Bagaimana anda membuang *"e-waste"*?)
[   ] Sell or donate (Jual/ Menderma)   [   ] Recycling (Kitar semula)
[   ] Repair and reuse (Membaiki dan guna semula)
[   ] Other. Please state (Lain-lain. Sila nyatakan): ……………………………………………..

REKA BENTUK (DESIGN)

d. INFRASTRUCTURES AND FACILITIES (INFRASTRUKTUR DAN KEMUDAHAN)

9) Do you agree that UKM have well-conditioned and environmental-friendly infrastructures and facilities? (Adakah anda setuju bahawa UKM mempunyai infrastruktur dan kemudahan yang baik dan mesra alam ?)

[ ] Yes (Ya)   [ ] No (Tidak)   [ ] Not Sure (Tidak Pasti)

10) Have you heard about "Green Technology" in UKM? (Anda pernah dengar tentang "Teknologi Hijau" di UKM?)
[ ] Yes (Ya)   [ ] No (Tidak)   [ ] Not Sure (Tidak Pasti)

11) Do you encourage UKM to have following green technology facilities in the campus?(Adakah anda menyokong UKM mempunyai kemudahan teknologi hijau di UKM seperti dibawah?)

	Yes (Ya)	No (Tidak)	Not Sure (Tidak Pasti)
Automatic lighting system (Ex: Street Lamp, Office corridors/ classroom/Hostel) (Sistem pencahayaan automatik (Cth: lampu jalan , koridor pejabat/bilik kuliah/asrama)			
Rain garden (reduce rain water run-off)			
Green roof (Green Plants on roof of building) (Bumbung hijau-Tumbuhan hijau di atas bumbung bagunan)			
LED lighting system (Sistem pencahayaan LED)			
Use recycled material to build new buildings(Ex: Container) (Menggunakan bahan kitar semula bagi membina bangunan baru(Cth: Kontena))			

e. TRANSPORTATION (PENGANGKUTAN)

12) Does UKM provide public transportation/buses in campus? (Adakah UKM menyediakan pengangkutan awam/ bas dalam kampus?)
[ ] Yes/Ya (Please go to Question 6, 7, 8/Sila jawab soalan 6, 7, 8)
[ ] No/Tidak (Please go to Question 9/ Sila jawab soalan 9)

13) Do you prefer public transport or own transport in the campus? (Pengangkutan yang anda lebih selesa digunakan dalam kampus?)
[ ] Public Transport (Pengangkutan Awam)
[ ]Own Transport (Pengangkutan Sendiri)
Please state your reason(Sila nyatakan sebab):…………………………………………

14) Are the buses in UKM campuses using environmental friendly fuel called Natural Gas Vehicle (NGV)? (Adakah bas-bas di kampus UKM menggunakan bahan api mesra alam iaitu " Natural Gas Vehicle" (NGV)?)

[ ] Yes (Ya)   [ ] No (Tidak)   [ ] Not Sure (Tidak Pasti)

15) Do you agree these activities in your campus?(Adakah anda setuju aktiviti-aktiviti berikut di kampus anda?)

Please answer questions below by using the following scale, tick (√) your answer: (5) Strongly Agree (4) Agree (3) Neutral (2) Disagree (1) Strongly Disagree *(Sila jawab soalan di bawah dengan menggunakan skala berikut , tandakan (√) jawapan anda: (5) Sangat Setuju (4) Setuju (3) Neutral (2) Tidak setuju (1) Sangat Tidak Setuju)*

	5	4	3	2	1
Use campus buses daily (Sentiasa menggunakan bas kampus)					
Use cycle or walking to go classes/office (Guna basikal/ berjalan kaki ke kuliah/ pejabat)					
UKM should monitor campus transportation services regulary (Ex: Bus condition, quality of service, Duration) (UKM harus mengawasi perkhidmatan pengangkutan (Cth: Keadaan bas, kualiti perkhidmatan, kekerapan bas))					
UKM have proper path for pedestrian/cyclists (UKM mempunyai lorong khas bagi pejalan kaki/ penunggang basikal)					
UKM have proper vehicle parking lot for students/staff/ visitors (UKM mempunyai tempat meletak kenderaan yang sesuai bagi pelajar/kakitangan/ pelawat)					
Do you prefer carpooling in UKM (Adakah anda suka berkongsi kereta/ kenderaan di UKM)					

SOCIAL(SOSIAL)

f. LANDSCAPE AND RECREATION (LANSKAP DAN REKREASI)

16) Does UKM have recreational facilities for the campus community such as park, reflexology,preserved forest, jogging track and etc.?
(Adakah UKM menyediakan kemudahan rekreasi kepada komuniti kampus seperti taman permainan, tempat reflexologi,hutan simpanan, trak jogging dan sebagainya?)
[ ] Yes (Ya)   [ ] No(Tidak)   [ ] Not Sure (Tidak Pasti)

17) How many times do you get involved in outdoor activities such as recreation in a month? (Berapa kali anda terlibat dalam aktiviti luar (outdoor) seperti berekreasi dalam sebulan?)
[ ] Daily (Setiap hari)   [ ] Once a week (Seminggu sekali)
[ ] Once in a month (Sebulan sekali)   [ ]None (Tiada)
[ ] Once in a year   (Setahun Sekali)

g. SAFETY AND SECURITY (KESELAMATAN)

18) Do you think UKM campus is safe? (Adakah kampus UKM ini selamat?)
[ ] Yes (Ya)   [ ] No (Tidak)   [ ] Not Sure (Tidak Pasti)

19) Does UKM have proper security services (Ex: Security circulation at night, road lamps, and security booths)? (Adakah UKM mempunyai perkhidmatan keselamatan yang baik (Cth: Rondaan waktu malam, lampu jalan dan pondok keselamatan))
[ ] Yes/ Ya *(Please go to Question 20/Sila jawab soalan 20)*
[ ] No(Tidak)   [ ] Not Sure (Tidak Pasti)

20) Have you been victims of these crimes in UKM campus? (Adakah anda menjadi mangsa jenayah di kampus UKM seperti di bawah?)
[ ] Robbery (Rompakan)   [ ] None (Tiada)
[ ] Snatch thieves (Kes ragut)   [ ] Sexual abuse (Gangguan seksual)
[ ] Crime (Ex: Murder/fighting) (Jenayah (Cth: Pembunuhan/ Pergaduhan))
[ ] Bullying/ Ragging (Kes Buli)
[ ] Others .Please State(Lain-lain. Sila nyatakan): …………………………………………….

SECTION D (SEKSYEN D): RECOMMENDATIONS (CADANGAN)

21) Are you satisfied with UKM's campus sustainability approaches thus far.
(Adakah anda berpuas hati dengan pendekatan kelestarian kampus   di UKM selama ini?)
[ ] Yes/ Ya
(Please state what are the approaches that you are satisfied with /Sila nyatakan pendekatan yang anda berpuas hati :
………
………………………………………………….)
[ ] No/ Tidak
(Please State Why/Sila nyatakan sebab:……………………………………....................
…………………………………………………………………….)
[ ] Not Sure (Tidak Pasti)

22) Do you have any suggestion(s) for UKM to improve their campus sustainability initiatives in future? (Adakah anda mempunyai cadangan kepada UKM bagi meningkatkan inisiatif kelestarian kampus pada masa akan datang?)
[ ] Yes / Ya   (Please state your suggestion/Sila nyatakan cadangan anda :
………
……………..)
[ ] No (Tidak)

THANK YOU

(TERIMA KASIH)