Greener Campus Awareness among International Students for a better Sustainable Campus Culture

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Abstract: *The objective of this study the green awareness among international within Universiti Sains Malaysia (USM) campus. Green awareness within each individual are important. Especially for university students, after graduate from university each student will entering to different companies or cooperates. The awareness of green practice of students help to influences on companies and cooperates to increase green practices and reduce carbon-footprint, especially when time past students might end-up take the role as manager or director, which able lead and bring in decision regarding to green practices. This is important not only for companies to create competitive advantages and company's reputation, but is a contribution for the planet. Without proactive green practices; pollution and wastes will be pushing our planet towards danger. Companies and cooperates able to bring development and profit to the country but result harm and massive pollution to the planet. Taking a chance in company practice towards green practice is the only chance to reduce the pollution to planet. Green awareness within students and public are relatively important, everyone person having the awareness able to help world, protecting and sustaining world resource is no a responsible for particular person, but is the responsible for each individual that living in the one and only planet earth.*

Keywords: *Green Awareness. Sustainable, Environment Awareness, Behaviour*

1. INTRODUCTION

Sustainable environment is considered as one of the most important knowledge to be educate in higher education. Awareness within university's students able to bring in positive influence toward nations, companies, industries and government. Environment awareness can be applied in educating, designing, industries innovation, recycling, waste managing, organic foods offering and sustainable development. Most researchers have conducted an extensive research on environmental sustainability attempts, but only few addressed the campus culture or behaviour aspect toward environment sustainability (Levy & Marans, 2012).

Thus,(Sanusi. Z & Khelghat-Doost, 2008) at Universiti Sains Malaysia (USM) had implemented educational sustainable development (ESD) that benefited the campus, and influence the society especially through Regional Centre of Expertise (RCE). RCE which lead by USM's coordinated role of educational sustainable development (ESD), that emphasize sustainable development, and implement green related educational content and practice. In Malaysia, green awareness within public and students are slowly being recognize, but as compare with certain develop country, Malaysia still not yet comprehensive enough in term of waste manage, pollution policy and knowledge. Therefore, the awareness among international students come across to be the highlight of the research, which allowing USM to understand the awareness level for different nationality students and bring in correct method to educate each student.

2. PROBLEM STATEMENT

The research among international students at Universiti Sains Malaysia (USM) still remain unknown. Required further investigation upon attitude towards greener campus awareness, and campus culture sustainability, as well as build up methods that can use by USM to fester up the environment behaviour sustainability (Levy &Marans, 2012). Three factors believed able to influence individual towards pro-environment behaviours, which are; social incentives; material incentives; and prompts/reminders. Three factors able to support the development of pro-environment behaviours: education, engagement, and assessment (Levy & Marans, 2012).

Conducting a comprehensive assessment about USM greener campus awareness, and its effect on campus culture sustainability, through testing international students attitude and awareness of pro-

environment behaviours, environmental knowledge, environmental concern, environmental awareness, social incentive, material incentive, and prompts/remainders. These all facilitate USM Committees in addressing any issues may raise either within or outer (societies) of the campus, and find a solution to overcome these issues, by figuring out the weakness to improve, strength to sustain, and harmful to eliminate which could results in a better campus culture toward environment, which positively influence on other Malaysian Universities to take advantage from this research.

3. RESEARCH OBJECTIVE

The objective of this research is to investigate factors that contribute in the green awareness of international students' in USM. To obtain the result, variables with the effects will be measure. The research objectives of this study will be as follows:

1. To examine USM international students' awareness toward campus culture of environmental sustainability.
2. To examine USM international students' awareness of green campus environment toward overall campus culture sustainability.
3. To examine the influences of USM campus culture of environment sustainability toward student's way of perceive, behave, and lifestyle.

4. RESEARCH QUESTIONS

This study illustrates a method for USM committees to undertake for building a greener campus environment that will create eventually sustainable campus culture for Universiti Sains Malaysia(USM). These three methods were applied by Levy and Marans (2012) to address the pro-environmental behaviour education, engagement, and assessment. Based on that I have recommended the below three hypotheses.

1. Does cross-cultural differences effect USM's international students to be aware of greener campus environment?
2. Do aspects of current campus culture of environment sustainability on USM students effect their lifestyle, choice, and perceive environmentally?
3. Does USM improve greener campus awareness among international students, able to bring better campus cultural sustainable?

5. SIGNIFICANCE OF STUDY

This study focused on constructing a strong base of "culture of environmental sustainability" through enhancing greener campus awareness at Universiti Sains Malaysia (USM). These could be conducted through three factors that are implemented by University of Michigan (UM) 2012 social incentive, material incentive and prompts/remainders, environmental knowledge and environmental concern (Chan &Lau, 2000), and pro-environmental behaviour (BCG report, 2009). encouraging USM's international students behaving in more environmental greener way for a better overall sustainable campus culture.

6. LITERATURE REVIEW

With increasing a company consideration of green environment through daily decisions exert a high pressure in figuring out greener ways that effect positively on the environment (Chien &Shih, 2007).In year 2015, Petaling Jaya, Malaysia has announced a warning for outdoor holiday specially in hot and dry season, where many diseases such as leptospirosis from unclean river, waterfall, and rubbish left behind. The dry season is where the risk is highest, Health Ministry director-general Datuk Dr Noor Hisham Abdullah stated that leisure areas near streams and waterfall can be polluted from the rubbish and food remain on the area side which bring more diseased animals (Sukumaran, 2015).

6.1. Pro-Environment Behaviour

Pro-Environment Behaviour defined by Kollmuss and Agyeman (2002) as "behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world", (e.g reduce resource and energy consumption, reuse recycle resources, minimize waste production). Pro-environment behaviour defined by another research as a behaviour that tend toward minimizing the harm to the environment as much as possible, and even maintain protecting it (Steg& Vlek, 2009).

Behaving environmentally is not to put our priority for personal gain and gratification, but for future to gain a better environment and benefits for whole societies (Mc Carty &Shrum, 2001; Kim & Choi, 2005). External and internal factors have some influence either positive or negative, on pro-environment behaviour external factors (Kollmuss & Agyeman, 2002).
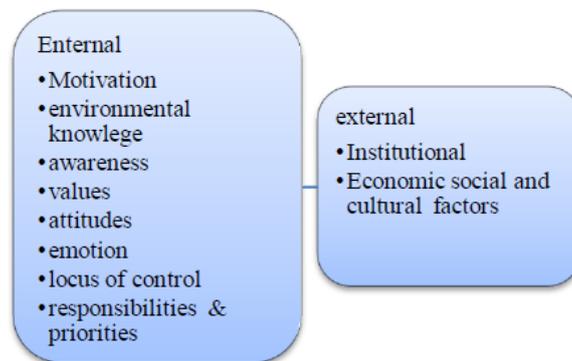

Figure1. *Factores effect Pro-enviroment behaviour. Kollmuss & Agyeman, (2002)*

6.2. Environmental Knowledge

Individuals have a relieve knowledge about the environment, is the one who took environmentally action (Bord et al., 2000). Environmental knowledge as "sets of ecological knowledge that an individual has environmental topics" (Conraud-Koellner & Rivas-Tovar, 2009). Both of the author believe that the major influence on environmental knowledge results from ecological ethnocentrism, degree of information, past behaviour and perceptions about green products. In addition, environmental knowledge founded by another researcher as the amount of knowledge that individual obtain regarding to environment matters (Chan & Lau, 2000).

Egyptian universities have focused on investigating the influence of three cognitive and attitudinal factors on gender differences in green purchasing behaviour (Mostafa, 2007). Environmental knowledge defined as a "knowledge that people know about the environmental, key relationships leading to environmental impacts, an appreciation of the 'whole systems', and collective responsebilities necessary for sustainable development". Environmental education has focused mainly on the learner's knowledge, attitudes and behaviour in relation to environmental phenomena and environmental problem (Lundholm, 2005).A number of study investigating students' scientific knowledge about understanding of environmental problems (Gomez-Granell & Cervera-March, 1993; Gambro and Switzky, 1996; Ivy et al, 1998).

6.3. Environmental Concern

Studying the concern of the students toward the current environment issues is an important method to investigate their environmental attitude and behaviour. Environmental concern has defined environment concern related to egoistic, social altruistic, and biospheric value orientations (Stem and Dietz, 1994). Environment concern is a predictive of environmental behaviour including recycling (Schultz & Oskamp, 1996). Perceiving environmental dangers were a result of three contribution factors-economic sacrifice, personal activities, and political activities (Clark & Stewart, 1997). Environment concern has no immediate effects on willingness to be environmentally friendly, but was allied to psychological consequences of environmental friendless and propose the findings may involve a meditational role for psychological consequences (Abdul-Muhmin, 2007). Environment concern as the arousing and awareness for consumers to the natural resources are limited and environmental under threat (Kalaftis& et al., 1999). Boosting the people concern about the environment will end up positively effect on their purchasing activities (Kalafatis & et al., 1999)

6.4. Environmental Awareness

Environmental awareness were classified into two characteristics (Xi& et al, 1998); Perception of environmental problems and behavioural inclination to protect the environment. The behaviour inclination separated into two figures to protect the environment; first, the environmental value as people perceive balance between environmental protection and economic development, and also the willingness to pay to save the environment. Second, attitudes toward participation in protecting the environment.

The solution of environmental problems must beginwith modification of human attitudes (Zhenmin & Xiaohua, 2002; Abdul-Wahab, 2008). The attitude toward environmental concernvary by gender, age, education level and other social variables (Brody, 1997). The environmental awareness was influenced by differs in age range, with older groups the more consistent response and higher overall index of environment awareness (Ziadat, 2010).

6.5. Green Supply Chain Management

However, with regard for increasing the global awareness toward environment protection, green supply chain management being implemented by the corporations to enhance their core competitive advantage (Ghobakhloo &et all, 2013).Green Supply Chain Management (GSCM) is considered one of the innovative idea that is fast gain attention of industry, and attract the interest of many researcher and practitioners of operations and supply Chain Management (Rao, 2007).

Based on the main objective of green manufacturing process, which is reducing the use of virgin material and other resources like energies to ultimately reduces the amount of waste at manufacturing stage (Ghobakhloo & et all, 2013). Currently waste management monitoring among the companies productions process increased. There are three main ways to minimize energy and resource consumption defined by (Linnhoff, 1993; Boustead & Hancock, 1979; Lee &et all, 1995) respectively, Pinch analysis, Industrial energy, and resource consumption. Green distribution is an extra important adding on green SCM. Defining green distribution as; "transportation service that has a lesser or reduced negative impact on human health and the natural environment when compared with competing transportation services that serve the same purpose" (Bjorklun, 2010).

Further, implementing of GSCM way has a positive effect on environmental and financial perform ance (Chien & Shih, 2007): that increased environmental performance results in boost corporation profit and market share. As well as they stated in their research, an execution of green supply chain management can guarantee both corporation itself and its suppliers obey environment regulation. Suppliers can influence in reducing transaction costs and promote recycling and reuse of raw materials, also corporations can reduce the production waste and hazardous, which preventing the corporation from being fined as a result of violation environmental regulations.

6.6. Campus Culture Sustainability

Sustainable development is one of the important topic for last decade and will maintain onward to be a critical for the future research (Patrick &et al., 2002), also an important part of many corporate social agendas (Linda Too & Bhishna Bajracharya, 2013). Both of the author stated discovering and evidence presented in the United Nations Climate Change Conferences in Mexico (2010) and South Africa (2011) have the need for paradigm shift toward constructing a low-carbon sustainable society to control over the climate change (Velazqmuez Contreras, 2002).

[...] a higher education institution that addresses, involves and promotes the minimisation of environmental, economics, societal and health negative effects in the use of their resources [in] its main functions of teaching, research, outreach and partnership, and stewardship to [help] society make the transition to sustainable lifestyles.

the impact and significance of the cultural facets of conversions to sustainable future for business institutions and engineering design are not regularly covered in university curriculum (Patrick &et al., 2002). The author also hope to motivate the course developer (universities) to take action in considering the cultural topics and approaches as extra tools to meet the education challenges for a sustainable future. Further also the authors believe that through understanding the nation culture influence is important when evaluation and integrating sustainability and environmental issues, and these all need to be understand by the firms to be globally successful (Patrick& et al., 2002).

6.7. Theoretical Model

Stern et al. s (1999) constricted value-belief model (VBN). This model hold personal norms (internal, sense of obligations to act accordingly, determined by values). In VBN model three individual's values are altruistic (obligations that individual sense to others), egocentric (individual's desire to protect own self), or biocentric (individual's responsibility in protracting environment and ecosystem), (Azizan &Wahid 2012).In TRA model has subjective norms and social pressures is a function of the perceived expectation by other individuals or group who are important or close to a person (e.g. friends, peers, and neighbours) as well as the person's motivation to comply with these expectation (Fishbein, and Ajzen, 1975).
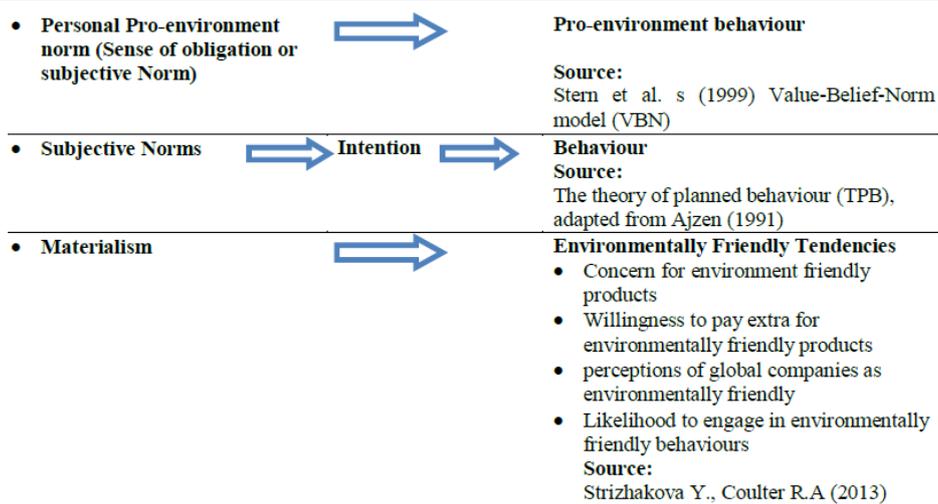
Figure2. *Theories of VBN, TPB, and Materialism*

7. METHODOLOGY

Methodology chapter illustrate theoretical analysis of the methods that being conducted in this research. This chapter will include research model and development of hypothesis, research design, population; sample size and sampling technique, scale and measurement, and statistical data analysis. As for data collection, will conduct within primary and secondary resource.

7.1. Conceptual Framework

Theoretical framework of this research was constricted based on the literature review. Constricting a measurement model from literature review and modify the model that can predict the result of greener campus awareness as dependent variable and influencing variables (independent variables). This research model, shown in Figure 3 will illustrate the relationship between independent variables and dependent variables.
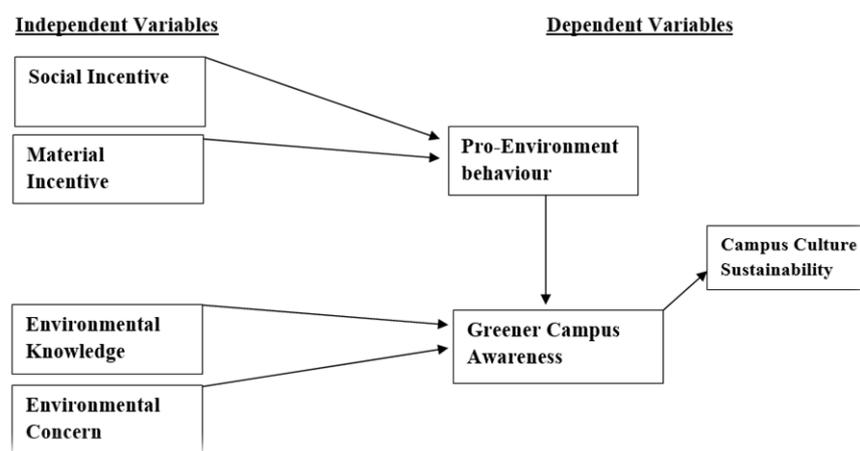

Figure3. *Research Framework of Greener Campus Awareness*

7.2. Research Hypothesis

Hypothesis developed as below table;

H_1	There is a significant relationship between Social Incentive and Pro-environment Behaviour.
H_2	There is a significant relationship between Material Incentive and Pro-environment Behaviour.
H_3	There is a significant relationship between Environmental knowledge and Greener Campus Awareness.
H_4	There is a significant relationship between Environmental Concern and Greener Campus Awareness.
H_5	There is a significant relationship between Pro-environmental Behaviour and Greener Campus Awareness.
H_6	There is a significant relationship between Greener campus awareness and Campus culture sustainability.

7.3. Sample Size and Sampling Technique

The questionnaire was distributed for 80 respondents, who are randomly selected from international students in USM.The questionnaire was distributed among international students at Universiti Sains Malaysia (USM) in main campus and engineering campus regardless of education level (e.g. undergraduate, master and PhD).The sampling method using unrestricted non-probability method and respondents selected were using the convenience approach in a natural environment.

7.4. Scale and Measurement

For sections 1 through 6 an interval scale used were respondents had to choose whether they agree or disagree. The interval scale was set from 1-5; strongly disagree -1, disagree -2, neutral -3, agree -4 and strongly agree -5.

Table1. Measurement of Independent Variables and Dependent Variable

Section No.	Variable name	No. of Items	Source
1	Pro-Environmental behaviour	8	BCG report 2009
2	Environmental knowledge	5	Chan and Lau, 2000
3	Environmental Concern	5	Chan and Lau, 2000
4	Social incentive	6	Strizhakova Y., Coulter R.A (2013)
5	Material incentive	3	Strizhakova Y., Coulter R.A (2013)
6	Environment awareness	3	Wesselink R., et all (2014)
7	Campus cultural sustainability		Levy and Marans (2012)

8. ANALYSIS AND RESULT

A total of 80 respondents were answered the questionnaires regarding to this study. The majority of the respondents were male, 61 (76.3%) male respondents, and 19 (23.8%) of the 80 respondents were female. Based on the aging group being tested on this survey which divided into 4 groups. First group aged under 20 years old were 11 (13.8%) of the 80 respondents. The majority were aged 21-25 years old, which shown in table 4.1 there were 28 (35%) out of 80 respondents. Also there were 23(28.8%) respondents categorize under 26-30 years old and 18 (22.5 %) respondents are above 30 years old.

There is a variety of nationality were being selected randomly. The majority were Arabian which are 36 (45%) of the respondents as stated in table 4.1. Followed by Indonesian 12 (15%) of the respondents, 4 (5%) were Iranian, 6 (7.5%) were Thai, 2 (2.5%) were Japan, German and Australian 1 (1.3%) of respondents, and 18 (22.5%) from other countries.

Based on the study program being involved, as shown below most of the respondents were undergraduates students 34 (42.5%) of the respondents, followed by PhD students were 29 (36.3%), and master students were 17 (21.3%). However, the majority of the respondents were Science students 51 (63.8%) of the respondents, 15 (18.8%) were Art students, and14 (17.5 %) were others major of study.

Moreover, there are two status of candidacy part time and full time, the majority are full time which are 63 (78.8%) of the respondents, 4 (5%) of the respondents are part time, and 13 (16.3%) of the respondents are exchange students. The majority of them are living inside the campus which are 45 (56.3%) of respondents, and 35 (43.8%) of respondents are living outside campus.

9. GOODNESS OF MEASURE

9.1. Reliability of Measure

The reliability test chosen was the Cronbach Alpha Test. The test was conducted on different instrument of the variables: pro-environmental behaviour (PEB), Environmental Knowledge (EK), Environmental Concern (EC), Social Incentive (SI), Material Incentive (MI), Campus Culture Environment (CCE), and Greener Campus Awareness (GCA). It is a reliability measure coefficient that reflects the goodness of the items through positively correlated to one another. The result stated in table 4.2 and Appendix B.

Table2. *Summary of Reliability Analysis*

Variable	Cronbach's Alpha	Number of item deleted	Total Item used
Pro-Environmental Behaviour (PEB)	0.762	-	8
Environmental Knowledge (EK)	0.687	-	5
Environmental Concern (EC)	0.724	-	5

Social Incentive (SI)	0.669	-	6
Material Incentive (MI)	0.824	-	3
Campus culture sustainability (CCS)	0.530	-	7
Greener Campus Awareness (GCA)	0.815	-	5

Based on table 2 summarize the results of Cronbach's Alpha value for the measuring items of independents and dependents variables. Cronbach's Alpha for attributive satisfaction was low at 0.670, and the accepted minimum value is 0.50 (Sekaran, 2003). While Kline 1999, proposed that the Alpha values ranged from 0.89 is reliable value. From table 4.2, all the Cronbach's Alpha values are higher than 0.65 except CCS where the Alpha value is low at 0.530.

9.2. Descriptive Analysis

The descriptive analysis of the variables illustrated in table 3.

Table3. *Overall Descriptive Statistics of the Study Variables*

Variable	Mean	Standard Deviation
Pro-Environmental Behaviour (PEB)	3.608	0.7073
Environmental Knowledge (EK)	3.62	0.692
Environmental Concern (EC)	3.85	0.702
Social Incentive (SI)	3.59	0.636
Material Incentive (MI)	3.35	0.869
Campus culture sustainability (CCS)	3.60	0.577
Greener Campus Awareness (GCA)	4.245	0.6818

9.3. Hypothesis Testing

9.3.1. Correlation Analysis

All the correlation are positive, except campus culture sustainable to environmental knowledge (CCS to EK) where the significant between them are too low. Whereas the rest indicate that there is a significant relationship between independent and dependent variables.

Table4. *Pearson's Correlation Coefficients of the Study Variables*

	PEB	EK	EC	SI	MI	EA	CCS
PEB	1						
EK	0.404**	1					
EC	0.483**	0.297**	1				
SI	0.360**	0.304**	0.332**	1			
MI	0.562**	0.300**	0.376**	0.508**	1		
GCA	0.330**	0.456**	0.479**	0.439**	0.253*	1	
CCS	0.371**	0.135	0.355**	0.321**	0.376**	0.217**	1

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

As a result, from the correlation coefficients data, below are the hypotheses that accepted and reject, which summarise as table below.

Table5. *Summary for Hypothesis Testing*

Hypotheses	Description	Results	ß Value
H1	Social Incentive is positively related to Pro-Environmental Behaviour	Rejected Not significant	ß = 0.111
H2	Material Incentive is positively related to Pro-Environmental Behaviour	Accepted	ß = 0417
H3	Pro-Environmental Behaviour is positively related to Greener Campus Awareness	Rejected Not Significant	ß = 0.012
H4	Environmental Knowledge is positively related to Greener Campus Awareness	Accepted	ß = 0.336
H5	Environmental Concern is positively related to Greener Campus Awareness	Accepted	ß = 0.360
H6	Greener Campus Awareness is positively related to Campus Culture Sustainability	Rejected Not Significant	ß = 0.184

10. DISCUSSION AND CONCLUSION

Result shows pro-environmental behaviour had a significant relationship with its Material incentive where the respondents are aware of selecting the materials that are environmentally friendly and easy to recycle that materials. Whereas social incentive had no relationship with pro-environment behaviour that based on the pervious analysis. In hypothesis H[4] and H[5]Environmental Knowledge and Environmental Concern were positively related to greener campus awareness. That indicated the respondents are knowledgeable and in the same time concern about the current situation of greener environment. Kalafatie, et al 1999, boosting the people concern about the environment will end up positively effect on their purchasing activities.

In hypothesis test H[3] pro-environment behaviour had no relationship with greener campus awareness as being illustrated in the results. Most of the researchers had found that pro-environment and environmental awareness are both of these variables are week and almost there is no relationship to each other. Lastly, from the result of H[6] predicts that there is no significant between greener campus awareness and campus culture sustainability. Which indicate there is no relationship between both of the variables, and greener campus awareness will not affect campus culture sustainability in either way.

11. LIMITATION

The research was conducted on a small sample size due to the time limit. Results with larger number of participants would have showed better interpretation. By considering this very limitation, it is recommended that future research shall utilize broader demographic profile to analyse respondents. Secondly, the research was only conducted for international students in main and engineering campus of Universiti Sains Malaysia, hence the research cannot be applied to all the students in Malaysia. Thirdly, not many variables were tested there is a chance of availability of intermediating variables. Fourth, respondent's honesty will influence the findings in this study. It because some of the respondents answer the questionnaire without a deep reading. This makes the result I get not accurate to reflect the real situation. Finally, the number of international females in Universiti Sains Malaysia are limited which hindered the chance of making a better assumption about the study.

12. FUTURE RESEARCH

1) This research need to be conducted on wider demographic area and includes all the students local and international in all Universities in Malaysia, because the more are the participants the more accurate measure of this study.
2) There is a chance of including intermediate variables or dependent or independent variables on the current model to make the study more reliable and accurate.
3) Encouraging universities students to conduct research on the green environment as part of their assignment for enhancing their knowledge and awareness toward current situation of the environment and take initiative to protect it.
4) Future research should focus on specific topic such as recycling, waste management, and environmentally friendly paper.

13. SUGGESTION FOR ENVIRONMENTAL IMPROVEMENT

Students suggestion for campus environment improvement and increase the awareness between USM students to take initiative in taking care of the environment. Suggestion provided as below;

- Using of Animated signboard in the campus to enhance the students to go green.
- Organizing workshop and seminar on how serious the impact of global warming, pollution and etc to raise students awareness.
- Opening shops for healthy and organic food.
- Organize activities and public speaking about environment.
- Organize environment campaign (go green campaign).
- Encourage students to use USM bus rather than their own cares.
- Rewards the students through certificates.
- Encourage students to use reusable staff, such as bottle (BPA Free) to reduce plastic trash.

- Applying Solar cell panel in campus.

- Enhancement during classroom teaching and get the students to observe and apply directly.

- Educating students through social media and TV.

- More recycle bins.

14. CONCLUSION

In conclusion the study had reached its objectives in investigating the influence of social incentive, material incentive, environmental knowledge, environmental concern and pro-environmental behaviour on greener campus awareness and which lead to a better campus culture sustainability. The results stated that material incentive, and environmental knowledge and environmental concern are significant influence greener campus awareness. As conclusion, with more concern and knowledgeable among students, the more likely for students to behave in environmentally friends and take action to protect the environment.

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