



Study on Sustainable Behaviour of Engineering Students in Technical University

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ABSTRACT

This study of the sustainable behaviour of engineering students in three technical universities in Malaysia was carried out to determine two things. First, the study seeks to find students' perception of their level of sustainable behaviour related to the environment. Second, to identify the relationship and the influence of demographic factors, internal and external, on sustainable behaviour. Three hundred and seventy-nine respondents were randomly selected from three technical universities, University Tun Hussein Onn Malaysia (UTHM), University Malaysia Pahang (UMP) and University Malaysia Perlis (UniMAP). The research method used quantitative survey using questionnaires as the research instrument. The questionnaire was divided into three parts. Part A was on demography of the students, while Part B focussed on sustainable behaviour and Part C was on the factors of sustainable behaviour. The analysis used a test score min, Pearson correlation and linear regression obtained using the Statistical Package for the Social Sciences (SPSS) software. The analysis showed that the perception of the level of sustainable behaviour of the students was high and positive. The findings also showed a positive and significant

relationship between sustainable behaviour and internal factors such as knowledge and internal motivation ($r=0.665$, $r=0.495$) and between sustainable behaviour and external factors, social influence social and external motivation ($r=0.593$, $r=0.299$). It is found that there is high relationships between knowledge, social influence, and motivation with sustainable behaviour. However, there

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is no relationship between demographic factors and sustainable behaviour.

Keywords: Engineering students, internal and external factor, sustainable behaviour

INTRODUCTION

The training in the concept of sustainability is important for engineers in order to solve problems related to sustainability at the local and global level. Therefore, engineering students at universities must be exposed to the concept of sustainable development. Some university students show interest in global environmental issues and display a positive attitude towards the environment but they do not seem to be pro-environmental in their daily activities (Ajzen & Fishbein, 2005). These students may need to develop some key internal factors that would help them to be truly pro-environmental. Students in higher learning institutions show unsatisfactory behaviour when it comes to the environment. This is because sustainable behaviour is not habitual for them (Tan & Azman, 2011). Individual behaviour can be changed through the influence of several factors (Bandura, 1986; Othman & Amiruddin, 2010). Among them are demographic factors, external factors and internal factors. The level of individual participation in environmental preservation is still low (Nickerson, 2003).

Engineers today do not display a positive attitude towards the environmental issues as professionals, and this does not guarantee a sustainable future for the nation (Azapagic, Perdan, & Shallcross, 2005; Amiruddin & Masek, 2014). What is taught in class to students should be made real to students by exposing them to real-world scenarios (Gardner & Stern, 1996; Mohd Affandi, Amiruddin, Che Hassan, & Zainudin, 2015).

This study aimed to identify the engineering students' perception on their level of sustainable behaviour in three technical universities in Malaysia and identify whether demographic factors, internal factors and external factors that lead to sustainable behavioural can change their behaviour regarding the environment. In addition, the study also identified the factors that influence change in sustainable behaviour among these engineering students. The conceptual framework in Figure 1 shows three independent variables i.e. demographic factors, external factors and internal factors, acting on the dependant variable which is sustainable behavior. The sustainable behaviour is composed of three components i.e. perception, action and determination or intention. These variables were used to measure the perception level of sustainable behaviour and the relationship between sustainable behaviour and the three factors of the independent variables.

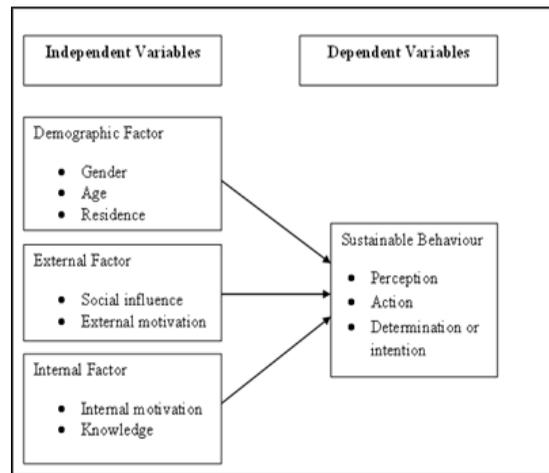


Figure 1. Conceptual framework adapted from the Planned Behaviour Model (Ajzen, 2001)

METHODOLOGY

In this study, the research method was the survey and the tool was the questionnaires. The three universities that were chosen for the study were University Tun Hussein Onn Malaysia (UTHM), University Malaysia Pahang (UMP) and University Malaysia Perlis (UniMAP), while Technical University of Melaka (UTeM) was chosen for the pilot study. A total of 379 respondents answered the questionnaires. In this study, a 5-point Likert scale was used. The section on sustainable behaviour was divided into three: B1 was on perception of the environment, B2 on sustainable actions in life and B3 on the intention or determination towards being pro-environmental. All the data were analysed using mean scores for descriptive statistics and Pearson correlation values for inferential statistics.

RESULTS AND DISCUSSION

The average mean scores for each section on sustainable behaviour are shown in Table

2. The mean score for intention or desire of students to conduct pro-environmental activities was positive and high, with 'responsibility' receiving the highest mean score. This shows that students believed that it is their responsibility to care for the environment (Samsudin & Ikhsan, 2015). There is a high and positive level of sustainable practices based on these engineering students' perception as they started to become aware of the importance of the environment. However, one item under sustainable practices showed a moderate level of sustainable behaviour among the students, 'willing to pay more for environmentally-friendly products' because the students were not willing to purchase sustainable products as they were more expensive. However, they showed interest in buying environmentally-friendly products, as this item received a high min score. The results showed that the students would buy environmentally-friendly products if the products were affordable.

Table 2
Level of perception of sustainable behaviour

Code	Section	Mean Score	Level Of Mean Score
B1	Perception of Environment	4.44	High
B2	Sustainable Action in Daily Life	4.05	High
B3	Determination or Intention Towards Being Pro-Environmental	4.10	High

Pearson correlation analysis was used to measure whether there is significant relationship between sustainable behaviour and demographic factors, internal factors and external factors. Table 3 shows the results for the Pearson correlation analysis of the relationship between sustainable behaviour and the demographic factors. The Pearson correlation analysis indicated that there is relationship between gender, age

and residence of students had a relationship with sustainable behaviour, but it was not significant. This finding is consistent with research by Bandura (1986), who also found that the demographic factors of gender and age had a relationship with sustainable behaviour. However, students' residence had a negative relationship with sustainable behavior.

Table 3
Relationship between sustainable behaviour and gender

		Gender	Age	Accommodation
Sustainable Behaviour	Pearson correlation	0.800	-0.93	-0.520
	Significant	0.122	0.71	0.311

The results of the analysis of the relationship between sustainable behaviour and internal factors is shown in Table 4. There was a significant positive relationship between environmental knowledge and internal motivation. The results show that environmental knowledge had a significant correlation with sustainable behaviour. This finding proves that knowledge of the environment has a positive relationship with

the practice of sustainable consumption (Sanacey, 2013). Indeed, sustainable behaviour is the result of the evolution of environmental knowledge, awareness and concern for the environment (Kollmus & Agyeman, 2002). Internal motivation had positive correlation with sustainable behaviour. This finding is supported by Zamhari and Ali (2014).

Table 4
Relationship between sustainable behaviour and internal factors

		Environmental Knowledge	Internal Motivation
Sustainable Behaviour	Pearson correlation	0.665	0.495

Table 5 shows the Pearson correlation values for the relationship between sustainable behaviour and external factors. There was a positive correlation between sustainable behaviour and social influence and between sustainable behavior and external motivation among the engineering students. Social factors are believed to influence sustainable behaviour (Tan & Azman, 2011). Motivation is correlated with pro-environmental practice concern for the environment is needed to be maintain

within the community (Zamhari & Ali, 2014). Social influence can shape students' sustainable behavior and encouraging them to perform sustainable practices (Amiruddin, Yunus, Mohd Hashim, Rahim, & Abd Rahim, 2015). External motivation can change sustainable behaviour through external stimuli or events (Rashid, 2007). The findings suggested that the engineering students would display sustainable behaviour when such behaviour brought them benefit only if such behaviour is beneficial to them.

Table 5
Relationship between sustainable behaviour and external factors

		Social Influence	External Motivation
Sustainable Behaviour	Pearson correlation	0.593	0.299

CONCLUSION

The results of the study showed that internal factors and external factors influence by encouraging the students' sustainable behaviour. The findings were in line with studies carried out by prior researchers that showed both factors had a positive correlation with sustainable behaviour. As for demographic factors, the analysis showed the opposite of what was found in previous studies. This is because most of the studies noted that demographic factors affected pro-environmental practices among the students. However, there are

also studies that support the findings of this study, which showed that not all the demographic factors correlated with sustainable behaviour among the students. Therefore, it can be concluded that this study of sustainable behaviour among engineering students at three technical universities in Malaysia has yielded positive results. The study also proved that engineering students display sustainable practices and are willing to apply them in their daily life in order to become engineer who promote sustainable development in line with national aspirations.

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