PEAT

A Study of Student Contribution Towards Developing New Approach of Sustainable Campus in UTHM Pagoh Campus

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Abstract: Sustainability of building is an initiative evolving various kinds of methodologies and materials enhancement, from techniques for generating energy to non-toxic cleaning products. Human activities are a significant contributor to environmental challenges such as climate change, global warming, environmental pollution, biodiversity loss, and environmental quality, all of which may jeopardise the planet's sustainability. As a result of the regular occurrences of disasters in their area, many colleges have created a sustainable campus. Other than that, the objective of the study is to identify initiated sustainable program towards green campus in UTHM Pagoh, to identify the level satisfaction of students on the current progress toward sustainable building and to analyse the level of students' involvement and contribution towards initiated sustainable programs. In this research, to determine the pattern of the situation, quantitative approaches were used. The data collected from respondents were analysed using SPSS and Microsoft Excel. This research also gives a proper recommendation based on data that have been collect and making analysis on the questionnaire that have been distributes. To conclude, the awareness level among students is moderate, and the result can be used for future research to ensure the level of students' awareness can be increased for the environmental aspect and can prevent from pollution and land destruction.

Keywords: Sustainable, Involvement, Satisfaction, Awareness, SPSS, Factor, Green Campus, Knowledge, Contribution

1. Introduction

The World Commission on Environment and Development (WCED,1987) entitled Our Common Future has raised the sustainability idea in the agenda of socio-economic and environmental dimensions of development to new heights [1]. At the International Green Buildings Conference in Singapore (October 2009), a United Nations Environment Programme (UNEP) expert, Dr Arab Hoballah stated that almost no country in the world can hope to achieve carbon dioxide-reduction targets without

including the building sector into their plan of action [3]. Building industry has been identified as one of the big resource users as buildings converge in themselves major indexes of energy and water consumption, raw material employment and usage of land [2].

"Green Technology" is an initiative evolving various kinds of methodologies and materials enhancement, from techniques for generating energy to non-toxic cleaning products. The main goal to achieve in this rapidly growing field includes sustainability of the economic development. With many scientific studies pertaining to the green technology pointing to global warming and climate changes caused by greenhouse gases, there is an ever-increasing societal push for environmentally friendly mechanisms to help reduce the impact resulting from fossil fuel consumption, landfill and industrial sector wastages. Current researches by industry groups are pursuing and exploring the alternative for green energy sources and production. Governments and World Energy Council (WEC) are playing the key roles to develop and implement a wide-scale of green technology efforts that meet the needs of society through indefinite ways into the future without damaging or depleting natural resources. In short, meeting present needs without compromising the future generation's ability to meet their own needs.

Green building is the practice of creating structures and using processes that are environmental and resource efficient throughout a building's life-cycle. It covers from sitting to design, construction, operation, maintenance, renovation, demolition; and everything from the choice of building materials to where a building is located. The operation of buildings has a tremendous impact on the world's natural resources and the environment. In the United States, building consume more than one-third of all the energy and two-thirds of all electricity used by the 76 million residential and commercial building, as reported by the U.S. Green Building Council [4]. It contributes to major air pollution of the urban air quality and ended up with the climate change, as mentioned in Building Materials [5]. Traditional buildings usually consume more energy resources than what necessary, and give negative impact to the environment by generating a large amount of waste.

1.1 Problem Statement

Throughout the development process, construction activities have an impact on the environment. These effects occur during the initial work on-site, during the construction phase, operational, and finally during the ultimate destruction phase when a building reaches the end of its useful life [6]. Even though the construction phase is relatively brief compared to the other phases of a building's life, it has a variety of significant environmental impacts. Indeed, awareness about the impact of construction operations on human and environmental health is growing [6]. While building projects can contribute to economic and social growth by increasing the standard of living and quality of life, they are also related to environmental degradation. Therefore, it is vital to alter human behaviour to safeguard and repair the environment, which is dependent not only on the regulatory structures in place but also on the everyday decisions made by each individual. Individual involvement, comprehension, and contribution to a sustainable campus are required to resolve the issue [7].

As a result, it is debatable whether universities can effectively educate students about environmental challenges. Universities are technology hubs and conceptual design centres [9]. It is an excellent location for instilling sustainable development ideas that enable the creation of social awareness about how sustainability can be integrated into daily life. Environmental education can influence an individual's environmental behaviour to foster a favourable attitude toward the environment, encourage accountability, and contribute to the protection of a more sustainable environment [8]. it enables higher education institutions to use their campuses to educate the public on a larger scale through campus-based sustainable development. Universities are the most likely of these societal sectors to safeguard the environment because "the future leaders, decision-makers, and intellectuals of the cultural, political, economic, and educational sectors are developed, moulded, and shaped within the world's higher education institutions [10].

However, it is asserted that Malaysian undergraduate students are inactive and unconcerned about participating in environmental initiatives. Malaysian undergraduate students continue to have a low level of knowledge, attitudes, abilities, and involvement in campus sustainability. Despite the paucity of empirical research on PEB in Malaysian universities, several relevant studies are visible in Malaysian public universities [8]. As such, this study intends to ascertain students' comprehension and contribution at the Universiti Tun Hussein Onn Malaysia Pagoh branch (UTHM). The Pagoh branch of Universiti Tun Hussein Onn Malaysia (UTHM) has been underdeveloped because to the presence of numerous sustainable and green technologies on campus, including a green roof, solar panels, urban farming, fertigation, and a green office. Several green practises, such as the Going Green Campaign and Public Relations Campaign discussions on Green Initiatives, have been implemented to foster a greener campus environment and to raise public awareness about the importance of environmental stewardship. These efforts have piqued undergraduate students' interest in taking pro-environmental action favouring a sustainable campus. However, investigations on these characteristics from the perspective of undergraduate students have gotten less attention in the university context in the past. It is the void that the current study will attempt to fill.

1.2 Aim and Scope

The aim of this study is to identify the students' understanding and awareness level of towards sustainability in campus. The scope of the study is limited to students of UTHM Pagoh. The population for this study was derived from Hal Ehwal Pelajar, Berita UTHM, which is based on the number of students enrolled at Universiti Tun Hussien Onn Malaysia for the second semester, session 2021/2022 (SEM2/2021/2022). The objectives of this study were as follows.

   a) To identify initiated sustainable program towards green campus.
   b) To identify the level satisfaction of students on the current progress toward sustainable building.
   c) To analyse the level of student's involvement and contribution towards initiated sustainable programs.

2. Methodology

A flow chart is formed as an infographic for the sequence of processes or parts involved in a system or activity. In this study, to determine the pattern of the situation, quantitative approaches were used. Therefore, the research methods and process of the study might be illustrated more clearly and understandably using this flow chart, as shown in Figure 1.
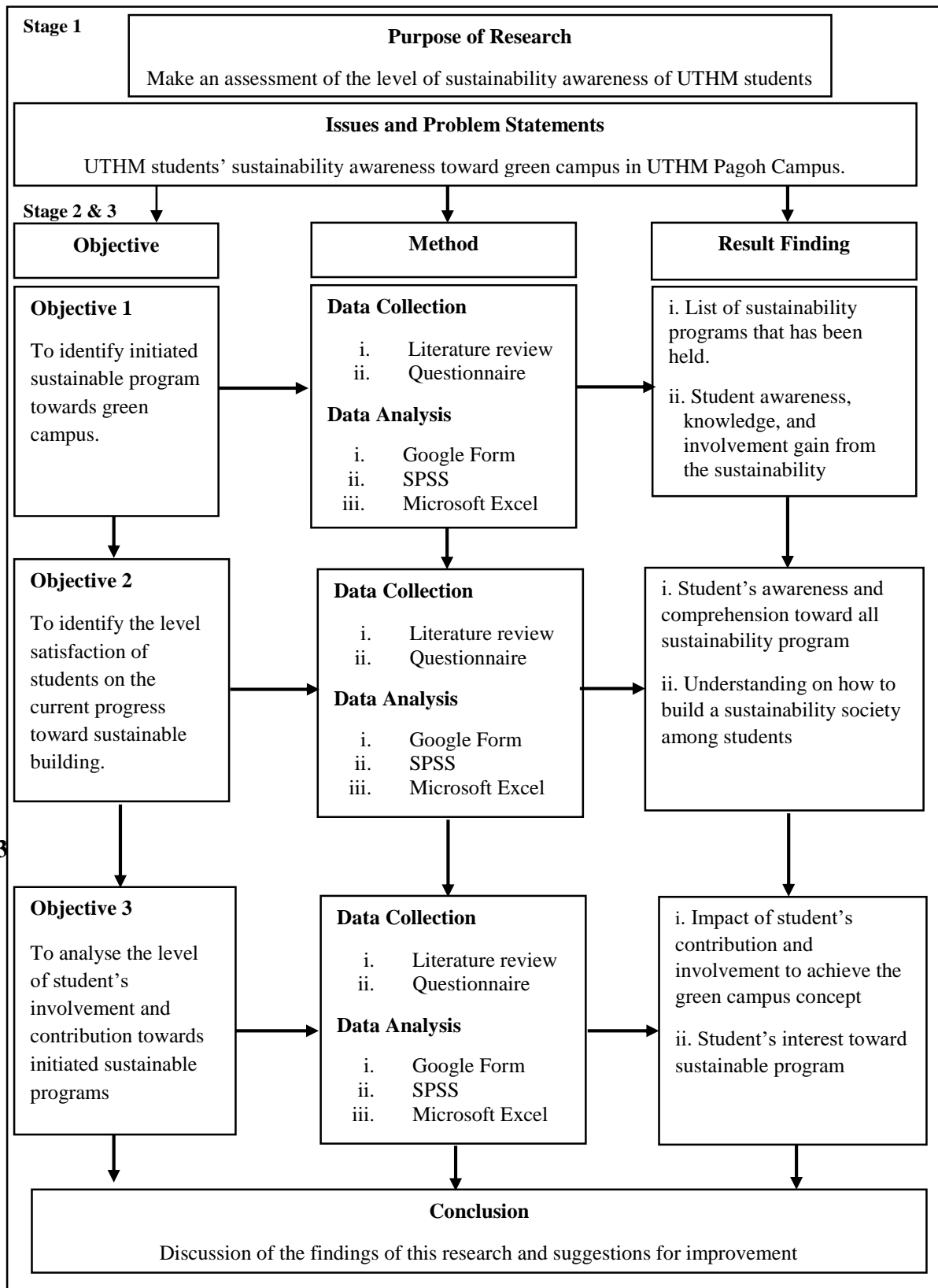
Stage 1	**Purpose of Research** Make an assessment of the level of sustainability awareness of UTHM students

Issues and Problem Statements

UTHM students' sustainability awareness toward green campus in UTHM Pagoh Campus.

Stage 2 & 3

Objective	**Method**	**Result Finding**
Objective 1 To identify initiated sustainable program towards green campus.	**Data Collection** i. Literature review ii. Questionnaire **Data Analysis** i. Google Form ii. SPSS iii. Microsoft Excel	i. List of sustainability programs that has been held. ii. Student awareness, knowledge, and involvement gain from the sustainability
Objective 2 To identify the level satisfaction of students on the current progress toward sustainable building.	**Data Collection** i. Literature review ii. Questionnaire **Data Analysis** i. Google Form ii. SPSS iii. Microsoft Excel	i. Student's awareness and comprehension toward all sustainability program ii. Understanding on how to build a sustainability society among students
Objective 3 To analyse the level of student's involvement and contribution towards initiated sustainable programs	**Data Collection** i. Literature review ii. Questionnaire **Data Analysis** i. Google Form ii. SPSS iii. Microsoft Excel	i. Impact of student's contribution and involvement to achieve the green campus concept ii. Student's interest toward sustainable program

Conclusion

Discussion of the findings of this research and suggestions for improvement

Figure 1: Flow chart for the sequence of this research

2.1 Questionnaires

For this study, the questionnaire design was based on the study's objectives. Five (5) points Likert scale and open-ended was used to measure respondent self-efficacy based on objectives 1, objectives 2, and objectives 3. The effectiveness of using five (5) points scale was based on the Cronbach's Alpha results.

In order to meet the research objectives, the questionnaire must be competent. So, queries needed in the literature review must be connected to the topic. The questionnaire must be completed in English and focused on sustainability in campus factor. The responders are unfamiliar with this sustainability and green building factor. The questionnaire was included four significant parts, Part A, Part B, Part C, and Part D, according to Table 1.

Table 1: Divided section of the question

Part	Items
Part A	Demographic Factors
Part B	Understanding of the concept of sustainability
Part C	Student's level of awareness and satisfaction of sustainability
Part D	Factors that contributed to the level of student's knowledge and awareness about sustainability toward green campus

2.2 Questionnaires Reliability

It is crucial to analyze the questionnaires to ensure every question is valid and understood by respondents when they answer the question. Therefore, a pilot study was conducted to verify the validity of the questionnaire survey utilized in this study. Eleven question samples of respondents were performed reliability analysis using the Statistical Package for Social Sciences (SPSS). Cronbach's Alpha (α) value for this sample question is 0.877, as shown in Table 2. Therefore, Cronbach's Alpha value criteria for interpreting alpha for Likert scale questions as shown in Table 3 [11]. Furthermore, that the validity of the questionnaire survey utilized in this study is in a "Good" state because $\alpha \geq 0.8$.

Table 2: Reliability Statistics

Cronbach's Alpha	N of Items
0.877	14

Table 3: Criteria Cronbach's Alpha value [11].

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

2.3 Data Interpretations

There are many interpretations for the questionnaire responses in this study. The question in Part C, and Part D is a Likert-scale pattern is rated on a variable depending on the level of agreement shown by respondents who complete the surveys. It may be done by calculating the frequency and percentage and the mean and mean average of the responses to the questions. To determine the variables examined in this study, the guidelines of the mean score have been fixed, as shown in Table 4.

Table 4: Mean score and their description [12]

Mean Score	Description
1.00-2.00	(1) Strongly disagree
2.00-3.00	(2) Disagree
3.00-4.00	(3) Neutral
4.00-5.00	(4) Agree
5.00	(5) Strongly agree

3. Discussion

3.1 Questionnaire Analysis

The questionnaire of this study was distributed to the students involved, and researchers managed to collect data from 132 respondents between 200 of population in the UTHM Pagoh campus [13]. Questionnaire data were obtained and analyzed using SPSS. The method of analysis used is by descriptive tests using frequency, percentage, mean, and standard deviation scores to achieve all objectives of this study.

3.1.1 Part A: Demographic Factors

This part is used to verify the respondents' demographic information, including variables such as gender, age, current study years, level of study, whether a diploma or degree, and residential BLOK in order to establish the respondents' credibility and elicit convenient responses

Table 5: Summary of respondent demographics

		Frequency (*f*)	Percent (%)
Gender	Female	46	34.8
	Male	86	65.2
Age	20 and below	13	9.8
	21 – 25 years	93	70.5
	26 – 30 years	26	19.7
Current level of study	Degree	108	81.8
	Diploma	24	18.2
	Postgraduate	0	0
Current study years	Year 1	12	9.2
	Year 2	23	17.7
	Year 3	59	45.4
	Year 4	36	27.7
Faculty	PPD	25	18.9
	FTK	82	62.1
	FAST	25	18.9

Table 5 shows that the majority of the respondents are male. It shows that male respondents were more interested in knowing about the sustainability awareness in their campus rather than female respondents. The questionnaires were obtained from 86 (65.20 %) male and 46 (34.80 %) female respondents from 132 (100.00 %) respondents.

Additionally, most respondents in this study are between 21 - 25 years old, with a frequency of 93 (70.50 %). The lowest age group respondents who answered the questionnaire are 20 years and below with a frequency of 13 (9.80 %), following 26 - 30 years old with a frequency of 26 (19.70 %). The percentage aged 21 – 25 years old is highest because most are bachelor's degrees from matriculation graduates.

Furthermore, the majority of respondents that provide feedback in this study are degree 108 (81.80 %), followed by a diploma 24 (18.20 %), and lastly, the lowest followed with master 0 (0.00 %). The current study years are 59 (45.40 %) from Year 3, followed by 36 (27.70 %) from Year 4, followed by 23 (17.70 %) from Year 2, and lastly followed by 12 (9.20 %) by Year 1. As a result, the students majority occupied by Year 3 during this semester.

Finally, the residential faculty in which the respondents represented. The highest responder ranking for faculty is from FTK 82 (62.10 %), followed by FAST and PPD with both 25 (18.90 %).

3.1.2 Part B: Objective 1

Part B has 6 questions highlighted to identify common types of fire protection systems installed in student residential colleges. Every part of 6 of the question consists of 4 questions. This sub-topic explained respondent awareness, knowledge, and comprehension of the sustainability programs, impact of sustainability for campus, and implementation of sustainability in detail. The respondent feedback in the Part B question is shown in Table 6.

Table 6: Respondent feedback in Part B question

Question 1	Is there any sustainable program in UTHM that you have joined?	
Answer	**Frequency (f)**	**Percent (%)**
Yes	57	43.2
No	59	44.7
Maybe	16	12.1
Total	**132**	**100.0**
Question 2	How many sustainable programs that you have joined since you started your studies in UTHM?	
Answer	**Frequency (f)**	**Percent (%)**
Only one program	72	54.4
More than one program	52	39.4
None	8	6.1
Total	**132**	**100.0**
Question 3	Is there any impact in terms of knowledge or awareness from the sustainable programs that you have joined?	
Answer	**Frequency (f)**	**Percent (%)**
Yes	95	72
No	7	5.3
Maybe	30	22.7
Total	**132**	**100.0**

Question 4	Do you think sustainability in UTHM is practiced/implemented properly?	
Answer	**Frequency (f)**	**Percent (%)**
Yes	123	93.2
No	9	6.8
Total	132	100.0
Questions	**Mean**	**Std. Deviation**
1	1.66	0.663
2	1.43	0.595
3	1.48	0.824
4	1.07	0.253

Table 6 shows the questions and mean score results of the Part B: Objective 1 questions. In general, the mean score for the statement (1) Is there any sustainable program in UTHM that you have joined? (M = 1.66, S.D = 0.663) ; (2) How many sustainable programs that you have joined since you started your studies in UTHM (M = 1.43, S.D = 0.595); (3) Is there any impact in terms of knowledge or awareness from the sustainable programs that you have joined (M = 1.48, S.D 0.824); (4) Do you think sustainability in UTHM is practiced/implemented properly (M = 1.07, S.D 0.253) was around 1.00 – 2.00, which meant the average of the respondents were disagreed toward identification initiated sustainable program towards green campus in UTHM Pagoh.

3.1.3 Part C: Objective 2

This chapter has 5 questions highlighted to identify the level satisfaction of students on the current progress toward sustainable building. The question type is Likert-scale question. Every question consists of 5 answer selection based on a rating scale from 1 to 5 which is "(1) strongly not satisfied", "(2) not satisfied", "(3) neutral", "(4) satisfied", and "(5) strongly satisfied". The respondent feedback in the Part C question is shown in Table 7.

Table 7: Respondent feedback in Part C question

Part C		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**Mean**	**Std. Deviation**
a) The current progress of Sustainable Campus in UTHM is going successfully	**(f)**	0	12	40	70	10	3.61	0.758
	(%)	0.0	9.1	30.3	53	7.6		
b) The concept of Sustainable Campus is really implemented in UTHM.	**(f)**	0	13	39	68	12	3.60	0.790
	(%)	0.0	9.8	29.5	51.5	9.1		
c) Students in UTHM are always been given exposure about Sustainable Campus concept.	**(f)**	0	16	38	68	10	3.55	0.794
	(%)	0.0	12.1	28.8	51.5	7.6		
d) Sustainable Campus program can approach students to explore more about sustainability.	**(f)**	0	12	35	72	13	3.65	0.781
	(%)	0.0	9.1	26.5	54.5	9.8		
e) UTHM is one of the universities in Malaysia that implement Green Campus.	**(f)**	0	13	39	69	11	3.60	0.780
	(%)	0.0	9.8	29.5	52.3	8.3		

Note: (1) Strongly not satisfied, (2) Not satisfied, (3) Neutral, (4) Satisfied, (5) Strongly satisfied, (f) Frequency, (%) Percentage

Table 7 shows the questions and mean score results of the Part C: Objective 2 questions. In general, the mean score for the statement (1) The current progress of sustainable campus in UTHM is going successfully (M = 3.61, S.D = 0.758) ; (2) The concept of sustainable campus is really implemented in UTHM (M = 3.60, S.D = 0.790); (3) Students in UTHM are always been given exposure about

sustainable campus concept (M = 3.55, S.D 0.794); (4) Sustainable campus program can approach students to explore more about sustainability (M = 3.65, S.D 0.781); (5) UTHM is one of the universities in Malaysia that implement Green campus (M = 3.60, S.D 0.780) was around 4.00-5.00, which meant the average of the respondents were agreed toward current progress and implementation of sustainability of campus in UTHM Pagoh.

3.1.4 Part D: Objective 3

This chapter has 7 questions highlighted to analyze the level of students' involvement and contribution towards initiated sustainable programs. The question type is Likert-scale question. Every question consists of 5 answer selection based on a rating scale from 1 to 5 which is "(1) never", "(2) seldom", "(3) sometimes", "(4) often", and "(5) very often". The respondent feedback in the Part D question is shown in Table 8.

Table 8: Respondent feedback in Part D question

Part D		(1)	(2)	(3)	(4)	(5)	Mean	Std. Deviation
a) I always thinking all building constructions are based on green technology principles	(f)	1	26	42	49	14	3.38	0.937
	(%)	0.8	19.7	31.8	37.1	10.6		
b) I always turn off the lights, electronic equipment, and any other electrical appliances when not using them.	(f)	0	24	40	52	16	3.45	0.928
	(%)	0.0	18.2	30.3	39.4	12.1		
c) Using water wisely (not letting faucets run, always reporting any drip and leaks).	(f)	0	23	38	56	15	3.48	0.912
	(%)	0.0	17.4	28.8	42.4	11.4		
a) Reduce water consumption when using the toilet.	(f)	0	24	37	55	16	3.49	0.920
	(%)	0.0	18.2	28	41.7	12.1		
b) Using public transportation or rideshare to attend classes.	(f)	0	24	37	56	15	3.46	0.920
	(%)	0.0	18.2	28	42.4	11.4		
c) I always reminding other students about sustainability.	(f)	4	23	41	46	18	3.41	1.003
	(%)	3	17.4	31.1	34.8	13.7		
d) I always take part in any sustainable programs held in the university.	(f)	0	26	42	49	15	3.42	0.925
	(%)	0.0	19.7	31.8	37.1	11.4		

Note: (1) Never, (2) Seldom, (3) Sometimes, (4) Often, (5) Very often, (f) Frequency, (%) Percentage

Table 8 shows the questions and mean score results of the Part D: Objective 3 questions. In general, the mean score for the statement (1) I always thinking all building constructions are based on green technology principles (M = 3.38, S.D = 0.937) ; (2) I always turn off the lights, electronic equipment, and any other electrical appliances when not using them (M = 3.45, S.D = 0.928); (3) Using water wisely (not letting faucets run, always reporting any drip and leaks) (M = 3.48, S.D 0.912); (4) Reduce water consumption when using the toilet (M = 3.49, S.D 0.920); (5) Using public transportation or rideshare to attend class (M = 3.46, S.D 0.920); (6) I always reminding other students about sustainability (M = 3.41, S.D = 1.003); (7) I always take part in any sustainable programs held in the university (M = 3.42, S.D = 0.925) was around 3.00-4.00, which meant the average of the respondents were neutral toward students' involvement and contribution towards initiated sustainable programs.

4.   Conclusion

In conclusion, the three objectives that have been proposed at the beginning of the research were achieved through quantitative approaches were used, which are questionnaires. In addition, the feedback of respondent for the first objective, to identify initiated sustainable programs toward green

campus, indicate that the majority of respondents are aware (agree) of the existence of the sustainable programs, this means that some respondents have been exposed to the sustainability campaign but some of them are not aware of the existence.

Next for the second objective, to identify the level satisfaction of students on the current progress toward sustainable building indicate that the majority of respondents satisfied and were aware of the sustainability campaign at the campus, only a handful of students still did not satisfy with the implementation of the sustainability campaign.

Subsequently, the third objective of the study is to analyse the level of students' involvement and contribution towards initiated sustainable programs on the first question of part D shows that the students always assumed that all building constructions are based on green technology. In addition, in the university campus, there are still a few students that not use the recycle bin and smoking in the toilets. This shows they do not aware with the concept of sustainability, and at the same time, their stubbornness is a factor that affects the level of awareness about sustainability in the campus.

Based on the literature review and questionnaires that have been made for this study, it can be concluded that the sustainability in campus is very important for every aspect and occupant. Pollution can occur if a person's stubbornness, knowledges and precautions on sustainability of campus are not taken seriously.

Finally, the researchers hope that this research can benefit all students of the UTHM Pagoh Campus. The results obtained from the survey questionnaire, observations, and perceptions of the respondents should be taken seriously by the management, as well as any parties involved, to provide a better and safer environment for everyone, especially UTHM students.

Acknowledgement

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