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Green Technology and Vocational College: A Preliminary Study

Anusuya Kaliappan[1*], Hashima Hamid[2]

[1,2]Faculty of Technical and Vocational Education,
Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, MALAYSIA

*Corresponding Author

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Abstract: Green technology is an environmental technology and critical to the future of our society. Its main significance is to find the means to produce technology in ways that do not damage or deplete the Earth's natural resources. Although, many studies have been conducted pertaining to green technology, but it remains unclear when it comes to the knowledge, attitude and practices of the students from vocational colleges in Malaysia. Therefore, the purpose of this study is to investigate the level of knowledge, attitude and practices regarding green technology among vocational colleges students. The study was conducted quantitatively using survey involving 183 students from 4 vocational colleges in Johor. A set of questionnaires was administered face to face and the data obtained were analysed using descriptive and inferential statistics such as frequency, percentage, mean, standard deviation, t-test and one-way ANOVA through Statistical Package for Social Science (SPSS) Version 23. The findings revealed the level of knowledge on green technology is average (mean=3.07), meanwhile level of attitude (mean=3.60) and practices on green technology (mean=4.00) are high among vocational colleges students. The findings also added that there is no significant difference in vocational colleges students' education level with knowledge, attitude and practices of green technology. It also demonstrated that there is no significant difference in vocational colleges students' undertaken courses with knowledge, attitude and practices of green technology. These findings are based on the notion that increasing knowledge will further influence behaviour change regarding green technology among vocational colleges students. These vocational colleges students are the future skilled and semi-skilled workers in the country and are future generation and therefore it is obligatory to inculcate them with knowledge, attitude and practices of green technology.

Keywords: Green technology, TVET, vocational college, quantitative, survey

1. Introduction

For some years, Technical and Vocational Education and Training (TVET) has been refashioned in the images of adapting skills training to changes in workplace practices with a growing emphasis on knowledge exchange, knowledge innovation and knowledge transfer. UNESCO (2002b) defines TVET as those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences; acquisition of practical skills, and attitudes; and understanding and knowledge related to occupations in various sectors of economic and social life. Existing research recognizes the critical role played by Technical and Vocational Education and Training (TVET) in contributing to the development of economy and employment to a country's national and local contexts (UNESCO, 2015). Therefore, this transition requires TVET to engage more systematically in response to the changing job opportunities and skills need such as the greening agenda. (UNESCO, 2014).

Recent evidence suggests that, UNESCO-UNEVOC has been engaged to strengthen TVET in the Asian region specifically, to develop skills and knowledge required for the transition to greener economies and societies (UNESCO 2015). Therefore, TVET has been getting attention from the United Nations Educational, Scientific and Cultural

*Corresponding author: anu_suya1@yahoo.com

Organization (UNESCO) and the World Bank due to the importance of TVET in the development of a nation. The academic literature on TVET recognized, it has been a key component of human resource development and highly in strategic of the G20 countries and fundamental to socio-economic development focusing on greening agenda (Paryono, 2017; Siddiky & Uh, 2020). Therefore, at national level in Malaysia, the government and Ministry of Education are focused on greening of TVET as a mainstream.

Based on the Malaysia Education Blueprint (2013-2025) for Higher Education under Shift 4: Quality TVET graduates, the Ministry of Education has underlined industry led curriculum as their main objective. As the industry is moving towards green technology as its main environmental technology, TVET is being accoladed a central role in the discussion about implementation of sustainable development and green economy, as it is providing 46% of skilled workers for the labour market. As ILO report (2012) states that the transformation to a greener economy could generate 15–60 million additional jobs over the next 2 decades and lift tens of millions of workers out of poverty, TVET education institutions must be on the front foot to provide a holistic education such as inculcating green technology in its curriculum.

However, there have been a number of studies pertaining to implementation and application of green technology in schools such as vocational colleges have reported that in general, Malaysians have poor understanding and lack of awareness regarding green technology and green skills (Kordi, Tarudin, Azmi, & Aziz, 2018; R. Mustapha, Mat Nashir, & Ma'arof, 2019; Sa'adi & Zainordin, 2019). Recent evidence even suggested that green technology is not even included as a part of the curriculum of Vocational Colleges, which is even more of a worrying situation (Kaliappan & Hamid, 2021). The understanding of green technology still remains unclear among vocational colleges students. Hence, this study is being conducted to look at the level of knowledge, attitude and practices towards green technology as these students are the future skilled and semi-skilled industrial labourers in this country.

Although, over the past decade, there has been many education institutions at secondary and tertiary level that provides TVET training in this country. Although, vocational colleges across Malaysia only provides about 13.2% of TVET graduates in this country, it is well regarded as the gold mine of talent pool by industries for its Vocational Education and Training (VET) (Jalil, Hisham, & Annas, 2015). There are 84 vocational colleges in Malaysia offering various courses related to TVET education at certificate and diploma level known as Malaysian Vocational Certificate and Malaysian Vocational Diploma (SEAMEO VOCTECH, 2019). Therefore, as discussed in the Malaysia Education Blueprint (2013-2025) for Higher Education, vocational colleges must be able to redesign the curriculum to be able to meet the industry's demand such as inclusion of green technology.

Education and training such as vocational colleges have a crucial role to play in successful transition of economies to green and clean development that is conducive to inclusive growth (Jagannathan, 2013). The growing pattern of climate change, depleting natural resources, excessive carbon emission, deforestation and non-biodegradable waste, has become a central issue on this planet and yet there is no systematic and comprehensive approach of it in the curriculum of vocational colleges (Jagannathan, 2013; Mustapha, 2016). Drawing on existing literature, the Paris agreement that was also signed by Malaysia, adopted the idea of legally binding accord on climate change aims at limiting global warming to 1.5 °C to fulfil the long term goal of keeping the global average increase to less than 2 °C above its pre-industrial level (Nowotny et al., 2018). Therefore, as the provider of skilled and semi-skilled workers to the labour market across the country, vocational colleges should be able to promote green technology in order to minimise environmental issues and destruction to planet caused by industries.

The existing literature on green technology has described it as an optimal solution to solve environmental issues. Green Technology is defined as development and application of products, equipment, and systems to conserve the environment and natural resources and to minimize or mitigate the negative effects of human activities (KeTTHA, 2017). However, this study outlines green technology as an approach and optimal solution to environmental issues and economic growth. Therefore, it is analytically suggested that vocational colleges should integrate green technology in order for their students to be preoccupied with green technology awareness so that they will be able to solve environmental issues in the right manner. In addition, vocational colleges should be able to provide the green technology knowledge base necessary to blend technology, product, and process development in conserving the environment (Jagannathan, 2013).

The generalisability of much published research on this issue supports the idea of integrating knowledge, attitude and practices regarding green technology to increase awareness among vocational colleges students. If students are exposed to knowledge, good attitude and best practices to preserve the environment, such as green technology, they will be environmentalists (Hamzah, Nashir, & Nashir, 2019). There are also other benefits if green technology being implemented in vocational colleges such as boost the employment rate among graduates, enhances problem solving skills, education in sustainable development in life and entrepreneurship education (Arasinah, Amaruni, Bushra, Normah, & Faizal, 2017; Jahonga, Ngore, & Muramba, 2015). It is also added that incorporating green technology could add value to life, not harming the environment and have faith in science and technology (Pavlova, 2012).

A large and growing body of literature has revealed, skilled and semi-skilled workers dominates about 62% of the labour market in in this country (World Economic Forum, 2016; Adzmi, Hamid, & Kamin, 2014). It is furthermore concerning that all industry-based jobs are rallying towards green technology and will dictate the economic growth in every country across the globe (Kaliappan & Hamid, 2021) As Malaysian TVET strategy planned through the 11 Malaysian plan underlines the need of technical and vocational skills to increase the human resource base to accelerate economic growth, vocational colleges should be responsible in offering graduates that have knowledge and understanding regarding green technology (Omar et al., 2020). As a consequence, the quality of TVET graduates produced by the country is vital for Malaysia's upstanding to join the ranks of developed countries (Cheong & Lee, 2016).

2. Objective, Research Questions and Hypothesis

The objective of this study is to investigate vocational colleges students' knowledge, attitude and practices regarding green technology. Information gained on students' knowledge, attitude and practices on green technology is fundamental as these young people will be responsible for the environment protection and conservation in the future. Moreover, the information obtained from this study could be useful for policy-makers, environmental learning program designers and lecturers. This study attempts to answer the following research questions:

a. What is the level of knowledge, attitude and practices on green technology among vocational college students?
b. Is there a difference between education level with knowledge, attitude and practices among vocational colleges students?
c. Is there a difference between undertaken courses with knowledge, attitude and practices among vocational colleges students?

The corresponding null hypotheses to these research questions were:

$H_0 1$: There is no significant difference in vocational colleges students' education level with knowledge, attitude and practices of green technology.

$H_0 2$: There is no significant difference in vocational colleges students' undertaken courses with knowledge, attitude and practices.

3. Methodology

This study is a quantitative study. In this research design, the researchers intended to ask specific narrow questions and measure the level of knowledge, attitude and practices regarding green technology among students from vocational colleges. Therefore, a survey is conducted to collect quantifiable data from respondents by conducting a survey in an unbiased, objective manner and analyses these numbers using statistics. According to Ghazali and Sufean (2018) & Creswell (2008) & survey is the most practical approach to administer a questionnaire to a small group of people (sample) to identify trends in attitudes, opinions, behaviours, or characteristics of a large group of people (population). Therefore in this study survey design is administered to describe trend and explanation of the relationship between knowledge, attitude and practices regarding green technology among students from 4 Vocational Colleges in Johor, Malaysia.

3.1 Sampling

The population of this study comprised of vocational Colleges students from Malaysia Vocational Certificate level and Malaysia Vocational Diploma level from engineering trades specifically Automotive Technology, Electrical Technology, Electronic Technology, Air Conditioning and Refrigeration Technology, Construction Technology, Industrial Machining Technology and Welding Technology representing 4 different vocational colleges in Johor, Malaysia. 183 students were chosen to take part in this study using stratified random and was determined using Krejie and Morgan (1970) sampling table. Stratified random sampling is a type of probability sampling. According to Creswell (2008), stratified random sampling is obtained by taking samples from each stratum or sub-group of a population. This is in line with this study as the researchers' need to ensure a balance ratio of the students to represent the 7 courses selected in 4 Vocational Colleges. Hence, only 26 to 27 students were selected to represent each course. A set of questionnaires were then administered to 183 respondents through their lecturers and the survey was conducted face to face.

3.2 Instrument

A set of questionnaires that was adapted from Johar (2013) was used in this study. The questionnaire consist of Section A, B, C and D. Section A requires respondents' demographic information, meanwhile section B, C and D consist of knowledge (12 items), attitude (24 items) and practices (11 items) variables. Total items administered in this questionnaire were 47 items. The researchers ensured the reliability and validity aspects of the instrument used. Creswell (2008), Golafashani (2003), Joppe (2000), Salkind (1997), Charles (1995) & Kirk and Miller (1986), define reliability as the extent to which results are consistent over time and an accurate representation of the total population under study and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable meanwhile validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are.

Validity of the instrument was determined through face validity and content validity. The questionnaire was given to language experts positioned as School Improvement Specialist Coach Plus (SISC+) from District Education Office to ensure the language used was suitable for the respondents to comprehend. Thenceforward, the researchers distributed the questionnaire to supervisors and senior lecturers in order to seek their opinions on questionnaire. Supervisors and senior lecturers then determine the value of questionnaire by looking at questionnaire. Hardesty and Creswell (2008) & Bearden (2004) defined content validity should measure the variable expected or intended to be measured and the items should represent all possible questions that could be asked about the content or skill.

The reliability of the instrument was referred to a measurement that supplies consistent results with equal values and measures consistency, precision, repeatability, and trustworthiness of a research (Chakrabartty, 2013; Blumberg et al., 2005). Hence, the researchers then conducted pilot study consist of 30 vocational colleges students to measure the internal consistency of the questionnaire (Cronbach, 1946). According to Pallant (2011), Alpha Cronbach Value which is greater than 0.6 often used as the index reliability of an instrument. Data obtained from pilot study reveals the reliability of knowledge (0.96), attitude (0.80) and practices (0.88). This demonstrates excellent reliability for knowledge meanwhile attitude and practices are good.

3.3 Data Analysis

Data analysis is a process of applying statistical or logical techniques to describe, illustrate, evaluate and interpret data. Data were analysed by descriptive and inferential statistics approach using SPSS version 23. The researchers labelled variables namely knowledge as (B1to B11), attitude as (C12 to C36) and practices as (D37 to D47). Afterwards, data cleansing process were carried out to fix or removing incorrect, corrupted, incorrectly formatted, duplicated or incomplete data within a dataset (Creswell, 2008). Next, the researchers conducted normality test using Kolmogorov-Smirnov Test. The normality test is conducted to determine the dataset is well-modelled by a normal distribution and as well as to decide the usage of either parametric test or non-parametric test.

Questionnaire was tested using 5 Likert Scale. The interpretation of mean score by Tschannen-Moran & Gareis (2004) was used to determine the level of knowledge, attitude and practices among Vocational Colleges students towards Green Technology as demonstrated in Table 1. As stated by Tschannen-Moran & Gareis (2004), the score between 4.21 to 5.00 indicates a very high level of consent, while the mean score between 3.41 to 4.20 indicates a high level of agreement. Next, the mean score between 2.61 to 3.40 suggests that the consent is at average level. And lastly, the mean score between 1.81 to 2.60 indicates a low level and the mean score of 1.00-1.80 indicates a very low level and is in bad condition.

Inferential statistics were used to describe and make inferences about the population. Inferential statistics used in this study are T-test and one-way ANOVA to test out null hypotheses stated above. All hypotheses were tested at $\alpha = 0.05$.

Table 1 - Interpretation of mean value

Min Value	Interpretation
1.00 - 1.80	Very Low
1.81 - 2.60	Low
2.61 - 3.40	Average
3.41 - 4.20	High
4.21 - 5.00	Very High

4. Findings

This study was conducted among 183 vocational colleges students from engineering trades specifically automotive technology, electrical technology, electronic technology, air conditioning and refrigeration technology, construction technology, industrial machining technology and welding technology representing 4 different vocational colleges in Johor, Malaysia. Students were selected randomly from 2 different levels which are Malaysia Vocational Diploma level and Malaysia Vocational Certificate level. Table 2 lists the information on the respondents' background with 149 (81.4%) respondents are male meanwhile 34 (18.6%) are female. Based on the overall analysis of the respondents' demographic, it can be said that most of the respondents were male compared to female while the level of education and courses are equally distributed.

Table 2 - Information of respondents' background (n=183)

Variables	Level / Category	Frequency	Percentage (%)
Gender	Male	149	81.4
	Female	34	18.6
Level of Education	Malaysia Vocational Certificate	92	50.3
	Malaysia Vocational Diploma	91	49.7
Course(s)	Automotive Technology	26	14.2
	Electrical Technology	26	14.2
	Electronic Technology	26	14.2
	Welding Technology	26	14.2
	Construction Technology	26	14.2
	Industrial Machining Technology	27	14.8

Air Conditioning and Refrigeration Technology	26	14.2	

a. Knowledge of Green Technology Among Vocational Colleges Students

Table 4.12 demonstrates the mean value of students' level of knowledge related to green technology in Vocational Colleges (mean = 3.07, SD = 1.01) indicates that the level of students' knowledge regarding green technology is average. Based on normality test conducted using Kolmogorov-Smirnov test, the data of knowledge regarding green technology (df = 183, sig.> 0.05) were not significant. This indicates that the data is normally distributed. Most respondents pointed out that they are able to identify green technology product, equipment or system (M=3.24) and match green technology practices and natural resource (M=3.17). The lowest mean was to draw a concept map of natural resource conservation practices (M=2.95) and the to define the meaning of green technology (M=2.98). Based on Table 3 as shown below, the descriptive analysis found that the overall mean of knowledge among Vocational Colleges students are average. Therefore, this suggests that the level of knowledge regarding green technology among Vocational Colleges students is average.

Table 3 - Students' knowledge regarding green technology

	Item	Mean Score	Standard Deviation	Interpretation
B1	Define the meaning of green technology	2.98	0.99	Average
B2	Express the practices of green technology	3.03	0.96	Average
B3	Identify green technology product, equipment or system	3.24	1.03	Average
B4	Label the main components in green technology practices	3.08	1.04	Average
B5	Name the main components in green technology practices	3.03	0.99	Average
B6	Describe the ethical compliance criteria of conserving green technology and natural resources	3.08	1.03	Average
B7	Select the main components in green technology practices	3.12	0.99	Average
B8	Match green technology practices and natural resource	3.17	1.03	Average
B9	Summarize the concept of green technology	3.01	0.98	Average
B10	Rewrite the concept of green technology	3.04	0.97	Average
B11	Draw a concept map of natural resource conservation practices	2.95	1.01	Average
B12	Restates the concept of green technology	3.13	1.06	Average
	Total	**3.07**	**1.01**	**Average**

b. Vocational Colleges Students' Attitude Regarding Green Technology

The mean value of students' level of attitude related to green technology in Vocational Colleges (mean = 3.60, SD = 1.10) indicates that the level of students' attitude regarding green technology is high. Based on normality test conducted using Kolmogorov-Smirnov test, the data of attitude regarding green technology (df = 183, sig.> 0.05) were not significant. This indicates that the data is normally distributed. Most respondents agreed that they close the windows when the air conditioner is operating which is the highest mean in attitude (M=4.37) and turn off the lights before leaving a room (M=4.30). The lowest mean was using sleep mode on the personal computer if it is not in use (M=2.93) and not using plastic bottles (M=3.03). Based on Table 4 as shown below, the descriptive analysis found that the overall mean of attitude regarding green technology among Vocational Colleges students is high.

Table 4 - Students' attitude regarding green technology

	Item	Mean Score	Standard Deviation	Interpretation
C13	I turn off the lights before leaving a room	4.30	0.80	Very High
C14	I use the stairs to get to another floor	3.96	0.95	High
C15	I use sleep mode on the personal computer if it is not in use	2.93	1.15	Average
C16	I use electrical appliances as my need	4.00	0.81	High

C17	I close the windows when the air conditioner is operating	4.37	0.86	Very High
C18	I make sure all electrical appliances are turned off before leaving any living area	4.26	0.85	Very High
C19	I inform the relevant authorities immediately if there is any waste of resources	3.57	0.96	High
C20	I make sure the water tap is turn off after use	4.16	0.93	High
C21	I do not flush the toilet unnecessarily	3.61	1.04	High
C22	I notify the technician immediately if there is any water pipe leakage	3.64	1.07	High
C23	I use both sides of the paper while printing using a printer	3.24	1.05	Average
C24	I reuse used papers while printing informal documents or draft copies	3.23	1.05	Average
C25	I reuse used envelopes and files	3.44	1.04	High
C26	I throw recycle items into the correct recycling bin	3.68	0.99	High
C27	I order food for class parties as needed	3.52	0.99	High
C28	I use environmentally friendly chemicals for cleaning and maintenance of workshop	3.11	1.07	Average
C29	I always segregate recyclable products on my own initiative	3.32	0.99	Average
C30	I make sure the products used at home, college and hostel are environmentally friendly	3.86	3.19	High
C31	I do not use plastic bottles	3.03	1.11	Average
C32	I do not use air freshener	3.05	1.07	Average
C33	I use eco -friendly food packaging	3.37	0.97	Average
C34	I use my own food containers to pack food and drinks	3.39	1.07	Average
C35	I carpool when attending college, extra classes and co -curricular activities	3.28	1.21	Average
C36	I walk to a nearby buildings	4.05	1.11	High
	Total	**3.60**	**1.10**	**High**

c. Green Technology Practices Among Vocational Colleges Students

The mean value of students' level of practices related to green technology in Vocational Colleges (mean = 4.00, SD= 0.86) indicates that the level of students' practices regarding green technology is high. Based on normality test conducted using Kolmogorov-Smirnov test, the data of practices regarding green technology (df = 183, sig.> 0.05) were not significant. This indicates that the data is normally distributed. Most respondents agreed that more recycling bins should be added in the college and dormitory area (M=4.23) and college environment needs more plants (M=4.18). The lowest mean suggested that buildings are built close to one other (M=3.75) and the field of engineering based on sustainable development (M=3.86). Based on Table 5 as shown below, the descriptive analysis found that the overall mean of practices regarding green technology among Vocational Colleges students is high.

Table 5 - Students' practices regarding green technology

	Item	Mean Score	Standard Deviation	Interpretation
D37	a college environment that needs more plants	4.18	0.95	High
D38	buildings are built close to one other	3.75	0.98	High
D39	pedestrian walkways are multiplied	4.05	0.82	High
D40	students' accommodation is increased in colleges	3.90	0.91	High
D41	increase green technology related innovation projects and competitions	3.92	0.86	High
D42	the field of engineering based on sustainable development	3.86	0.80	High
D43	emphasis on environmental issues and needs in sustainable development	3.99	0.79	High
D44	practicing the concept of waste reduction in daily activities	4.07	0.80	High

D45	participating in volunteerism related to environmental issues	4.00	0.89	High
D46	to add more recycling bins in the college and dormitory area	4.23	0.83	Very High
D47	to create green technology corner or green technology week so that it creates better understanding regarding green technology	4.14	0.93	High
	Total	**4.00**	**0.86**	**High**

d. The Difference Between Vocational Colleges Students' Education Level with Knowledge, Attitude and Practices

Based on Independent T-test conducted as Table 6 shows there is no significant difference of Green Technology in Vocational Colleges students' education level with knowledge, attitude and practices of green technology. Levene's Test for Equality of Variances reveals (F=.028, sig. 0.866) significantly more $p > 0.05$. Therefore, it indicates both of the sample (students' education level) came from the same population. Meanwhile, in t-test for Equality of Means shows t-value = .493, df = 181, Sig. (2 tailed) = .622 significantly more than $p > 0.05$. Hence, the null hypothesis ($H_0$1) is accepted. This confirms that Vocational Colleges students' education level does not affect knowledge, attitude and practices regarding green technology.

Table 6 - Students' education level and knowledge, attitude and practices of green technology

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Knowledge, Attitude and Practices of Green Technology	Equal variances assumed	.028	.866	.493	181	.622	1.55925	3.16018	-4.67630	7.79479
	Equal variances not assumed			.493	180.999	.622	1.55925	3.15995	-4.67583	7.79432

e. The difference between Vocational Colleges Students' Undertaken Courses with Knowledge, Attitude and Practices of Green Technology

Results of one-way ANOVA on Table 7 analyses the mean score of knowledge, attitude and practices of green technology between students' undertaken courses in Vocational Colleges to test $H_0$2. Findings revealed that there is no significant difference in knowledge, attitude and practices between students' courses, $F(6,182) = 1.542$, $P < .167$. Therefore, the null hypothesis ($H_0$2) is accepted. This confirms that Vocational Colleges students' undertaken courses does not affect knowledge, attitude and practices regarding green technology. Cohen's *d* was performed to indicate effect size for the comparison between means. The effect size confirmed at 0.05 which is medium in relative size. Hence, the result demonstrates that 69% of student's courses affect knowledge, attitude and practices of green technology.

Table 7 - Students' courses and knowledge, attitude and practices of green technology

Knowledge, Attitude and Practices of Green Technology	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4135.793	6	689.299	1.542	.167
Within Groups	78670.873	176	446.994		
Total	82806.667	182			

5. Discussion

The evidence from this study suggests that knowledge is at average level regarding green technology among Vocational Colleges students. A similar scenario has also been reported in other studies across the globe. The findings from (Kordi, Tarudin, Azmi, & Aziz, 2018; Ngadiman, Ahmad, & Amiruddin, 2017; Salas-Zapata, Ríos-Osorio, &

Cardona-Arias, 2018) discussed similar outcomes in their respondents' low level of knowledge regarding green technology. It is somewhat surprising to note that level of knowledge was high on some studies as reported in (Mustapha et al., 2019; Rahim & Musa, 2018; Md Kassim & Puteh, 2018; Hussin & Hafit, 2018; Azmi, Musa, Abdullah, Othman, & Fam, 2017; Er et al., 2017; Erhabor & Don, 2016; Kalsum & Isa, 2016). Knowledge as described by the study encompasses the participants' tendency to comprehend green technology as a solution to environmental issues related to ecosystems and or natural resources. A possible explanation behind average level of knowledge regarding green technology is lack of exposure to the importance of green technology itself and the requirement to concern about environmental issues and its solution is very minimal for the students (Norlaila, Kalthum, Nor Azah, & Noorita, 2017). One possible implication is that students that has particular knowledge specifically about green technology will be more effective in a given situation as solving environmental issues. This approach is seen as vital to ensure the environmental quality is preserved for future generations.

However, contrary to the expectation the level of attitude among Vocational Colleges students were high as seen from findings above. There is a debate over concern that in general students' have a positive and encouraging attitude towards green technology but their willingness to participate accordingly raises a lot of unwanted questions and uncertainties over the findings (Salas-Zapata et al., 2018). This finding is coherent with a number of studies that found out their respondents' attitude is higher and better than the level of knowledge (Mustapha et al., 2019; Md Kassim & Puteh, 2018; Bashirun, Badrolhisam, & Johari, 2016; Erhabor & Don, 2016). The positive attitude among the students denotes that green technology has great prospect in actualizing its goals as a great solution to all environmental issues in the country (Erhabor & Don, 2016). Surprisingly, some of the studies confirmed that their respondents' attitude is average and not satisfactory (Ngadiman et al., 2017; Norlaila et al., 2017; Kalsum & Isa, 2016) when it comes to green technology awareness and other environmental education. These results further support the idea that future curricula at primary and secondary levels need to apply education to the environment in education. Education at this early stage is crucial to forming individual behaviour when students are matured (Hussin & Hafit, 2018). This finding broadly supports the work of other studies in this area linking knowledge with attitude as there is a very strong correlation between these two variables as it is also mentioned in some other studies (Abuhashesh, Nusairat, & Masa'deh, 2020; Md Kassim & Puteh, 2018; Norlaila et al., 2017; Ahmad, Madi,; Kalsum & Isa, 2016).

The next section of the survey revealed practices related to green technology among Vocational Colleges students are observed to be high from this study. According to Da Silva (2015), found positive attitudes, or high scores, for green technology practices such as a high participation in environmental activities, including the incorporation of green technology in daily life activities. Another possible alternative explanation of our findings is that they are due to the cumulative impact of large numbers of individuals or a population making marginal improvements in their environmental effect will be a marginal collective improvement in environmental effect (Perrault & Clark, 2018). There were some similar studies suggested that practices related to green technology is high (Mustapha et al., 2019; Perrault & Clark, 2018; Salas-Zapata et al., 2018; Musa, Mamat, Yunus, Mohamad, & Safri, 2015) . There are however, several studies that found practices are negative or below satisfactory level in their study (Ahmad et al., 2020; Hussin & Hafit, 2018). The reasoning behind a low level of practices regarding green technology is said to be students are inconvenient. It is further supported that schools and education institutions should be able to facilitate some changes in students' environment so that it will lead to changes in students' practices (Perrault & Clark, 2018). For the practicality of this study, green technology is anticipated to be well implemented when these practices are understood.

In this regard, the KAP model provide an initial approach to perspectives of green technology that prevail in different populations, as a basis to explore the success or failure of initiatives that promotes green technology. The KAP model incorporates three pillars, which are knowledge, attitude, and practice. The earliest model used to measure and explain about environmental and sustainability awareness was the one proposed by Ramsey and Rickson (1976), on pro-environmental behaviour. The KAP model relates cognitive, affective and behavioural elements that are subject to intervention from communicative actions that increase the level of knowledge, change attitudes and improve practices. However, the model is unable to provide a comprehensive explanation regarding the validity of behavioural (Dwyer, Porter, Cobern and Leeming,1993 & Sivek and Hungerford, 1989). Critics have argued that the shaping of attitudes and behaviour towards the environment protection is more complex than what it was traditionally understood. It is believed that the KAP model fails to acknowledge, the acquisition of knowledge need not necessarily change attitudes, and changes in attitudes also need not necessarily change behaviour. Ultimately, it would be a more comprehensive model if it is able to synthesise the knowledge of sustainability and its different perspectives, the types of populations who share these perspectives, the most relevant attitude types and the categories of human action through which these perspectives produce such visions of sustainability and green technology (Salas-Zapata et al., 2018).

Based on Theory of Planned Behaviour (TPB), knowledge ultimately influences the intended behaviour and final behaviour to be performed in human being (Ajzen & Fishbein, 1985). Meanwhile, attitude does not directly determine behaviour but it does so indirectly through the intention to do so. The theory further indicates student's green technology behaviour change is influenced by perception, determination or intention and action. It is also emphasized that the proposed behaviour is affected by the attitude, subjective norms and perceived behavioural controls (Kalsum & Isa, 2016). These three main factors are inter-related between one another and are used to predict and explain the proposed behaviour of the students' cognizance regarding green technology. Adding further to these findings, in a recent study conducted by Fien and Tilbury (2002), suggested that proportional knowledge will not bring about behavioural change in students' awareness towards any environmental issues or solutions. This is even deeply and profoundly explained that

the knowledge that the students received has no influence on their attitudes and behaviours (Karpudewan & Zurida, 2018). Therefore, students' need to be inculcated with 'knowledge about the environment' rather than 'knowledge on how to work for the environment' in order for students to learn about the environment (Fien &Tilbury, 2002). These changes will facilitate in behavioural changes in students indirectly due to a better comprehension regarding environmental issues and its solutions to conserve this mother earth for future generations.

6. Conclusion

Collectively, this study outlines a critical role of the average level of knowledge regarding green technology among Vocational Colleges students. Although, attitude and practices are at high level, but knowledge is the most important factor among. Therefore, it is vital for policy-makers, environmental learning program designers and lecturers to come out with green technology curriculum that suits the need of Vocational Colleges students. Integrated and collaborative strategies with all parties involved with TVET and green technology must be brought in to design this curriculum to also suit the industry's need. Green technology education integrated with projects and expertise from business and industry can serve as role models to excite more students the importance of it. The evidence reviewed here seems to suggest a pertinent role for proper trainings in particular regarding green technology to be given to Vocational Colleges students who are then going to be skilled and semi-skilled workers in industries across the country. Taken together, this study also supports the notion of life-long learning among the Vocational Colleges students regarding green technology by not only limiting the knowledge in classrooms and education institutions. Henceforward, students must be encouraged and be guided the pathway to continue professional courses once they have graduated from Vocational colleges.

Overall, this study strengthens the idea that TVET schools and education institutions such as Vocational Colleges has to play crucial responsibility in turning society to practice green technology and sustainability. In the new global world, climate change, depleting natural resources, excessive carbon emission, deforestation and non-biodegradable waste, has become a central issue on this planet. In order to maintain and conserve our environment, we need quality air, renewable energy, stable climate, non-toxic water and green waste management. The resulting solution is for education institutions to have profound moral responsibility to increase awareness, knowledge, attitude, practices, skill and values needed to create a sustainable future for the next generations. The findings from this study revealed that knowledge regarding green technology among Vocational Colleges students is at average although they possesses high attitude and practices. In general, this study strengthens the idea of increasing knowledge will further influence behaviour change pertaining to green technology. We must accept the fact that green technology has come to stay not only in Malaysia but also around the world for the next generations. The future generation must be able to experience and live in this beloved mother earth. This was exquisitely explained by Emerson the 19th century poet that 'we have not inherited this earth from our parents to do with it what we will but we have borrowed it from our children and we must be careful to use it in their interests as well as our own'.

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