Green Practice Knowledge Profiling among the Technical and Vocational Education Masters Programme Students

M.F. Lee, N.S. Muhtar & C.S. Lai
Faculty of Technical & Vocational Education,
Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor
E-mail: mflee@uthm.edu.my

Abstract. Global warming is utmost problem because of the negative impact to all creatures of the earth. The best solution for this issue should through education. Therefore, this study was conducted to identify the green practice knowledge among the Technical and Vocational Education Masters’ students in Universiti Tun Hussein Onn Malaysia. Green practice knowledge refer to National Green Technology Policy four key areas by KeTTHA which is energy sector, building sector, water and waste water management sector, and transportation sector. A total numbers of 87 students were selected as respondent using stratified sampling technique in this study. A survey method using questionnaire was employed as research design for this study. The gathered data were analyse using sum, mean score, standard deviation, Kruskall Wallis test and Mann Whitney U test. The findings found that the level of green practice knowledge was at the medium level. The findings also shown that there was no significant in the level of green practice knowledge from the aspect of gender and background of study among the respondents. However, there was a significant difference in green practice knowledge among the respondents in terms of age. As a conclusion, the global warming impact can be minimize by increasing the green knowledge, awareness and practising among the communities in their lifestyle.

1. Introduction
The global warming triggered extreme climate phenomena that resulted in various natural disasters such as snowstorms and floods throughout the world. If this phenomenon is not being controlled, there will be major catastrophes that will hit the world's inhabitants. According to Wan Omar (2009), the impact of global warming has been felt in Malaysia only in moderate capacity compared to other countries. He also noted that the rise in global temperatures can cause changes in nature, including rising sea levels and extreme weather such as floods, droughts, heat waves, typhoon and tornado. In addition, the phenomenon of global warming has also resulted in the occurrence of long, dry, and dry droughts. This situation will also result in the occurrence of forest fires that can kill lives, destroying property, crops and pets. The fire also invites the occurrence of haze that can affect human health and vision. Overall, the issue of global warming is a world issue and not just involving some countries. Malaysia's contribution to global warming may not be so great, but as a global contribution of Malaysians, it is necessary to seek an end to the day-to-day activities that will not contribute to the ever increasing global temperature. Sulaiman and Junus (2005) state that extreme weather changes are heavily influenced by human activity. Therefore, Malaysians should practicing green practices in their daily lives as a must to fight the issue of global warming.

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd
While the results of the study conducted by Muhd Hussin (2007) found that the environmental awareness and understanding of the students on green concepts were at a satisfactory level. However, assessments of student attitudes and practices on green are at a moderate level. The only way to overcome the issue of global warming is through education, and the teachers will play an utmost important role. When educators are knowledgeable about green practices in everyday life, they can influence their students and the people surrounding to participate in practising green during everyday life. Malaysia has been prominent as a developing country. Malaysia is facing a huge challenge in ensuring country development can be sustained. Among the environmental issues that are often discussed today are, urban air quality, river water quality, forest destruction, household waste and waste and chemicals from the plant are examples of environmental issues occurring in Malaysia. Although green practices were introduced in the early 2000s, the study on green practices in Malaysia is remain under investigate. Therefore, this study aims to determine green practise knowledge among the students of Master of Technical and Vocational Education, University Tun Hussein Onn Malaysia (UTHM). The research questions of this study are as follows:

- What is the level of knowledge of Green practice among students?
- Is there a significant difference in green practices knowledge level from the aspect of gender?
- Is there a significant difference in green practices knowledge level from the aspect of age?
- Is there a significant difference in green practices knowledge level from the aspect of courses?
- Is there a significant difference in green practices knowledge level from the aspect of mode of study?

2. Green Practice Knowledge
The green practices emphasized in this study are the concept of vehicle sharing, energy saving and water resources, the reduction of use of disposable items and the use of green technology among the students. These elements are based on National Green Technology Policy Pillars (KeTTHA, 2011) as follow:

- Energy - Seek to attain energy independence and promote efficient utilisation;
- Environment - Conserve and minimize the impact on the environment;
- Economy - Enhance the national economic development through the use of technology; and
- Social - Improve the quality of life for all.

According to KeTTHA (2011), the significant progress and major improvement must be done in the following four (4) key areas to achieve National Green Technology Policy Pillars. The first key area is energy sector and energy utilization sector, which includes application of Green Technology in power generation and in the energy supply side management, including co-generation by the industrial and commercial sectors; as well as application of Green Technology in all energy utilization sectors and in demand side management programmes. Second key area is buildings sector that focus on adoption of Green Technology in the construction, management, maintenance and demolition of buildings. The third key area is water and waste water management sector that emphasize on adoption of Green Technology in the construction, management, maintenance and demolition of buildings. Fourth key area is transportation sector that cater on incorporation of Green Technology in the transportation infrastructure and vehicles, in particular, biofuels and public road transport.

3. Methodology
The research design for this study was a survey using an achievement test as instrument. A total number of 87 Technical and Vocational Education Master students was involved in this study. The sample was selected using stratified sampling technique. An achievement test was developed to measure the samples’ green practice knowledge based on National Green Technology Policy four key
areas by KeTTHA which is energy sector, building sector, water and waste water management sector, and transportation sector. The reliability test for this achievement test using alpha Cronbach was .916. The gathered data were analyse using sum, mean score, standard deviation, Kruskall Wallis test and Mann Whitney U test. In order to determine the green practice knowledge level among the samples, the total scores of them was categorize into three group, namely low, medium, and high level.

4. Results

Table 1 shows the score of respondents in green practise knowledge. Findings indicate that the level of knowledge in green practice among students of Master of Technical and Vocational Education, was at a moderate level. The average score among of them was 11.07 with standard deviation = 1.66. This means that the students only can answered correctly 11 from the 16 questions given. The minimum score was 6 and the maximum score was 15.

| Mean Score | Standard Deviation | Minimum score | Maximum score | Level  |
|------------|--------------------|---------------|---------------|-------|
| 11.07 / 16 | 1.66               | 6/16          | 15 / 16       | Medium|

Table 2 shows the score of green practise knowledge between male and female students. Findings determine that male students (M=11.13; SD=2.21) tend to have higher mean score than female students (M=11.06, SD=1.45). However minimum score for female was 8 while male was 6 and the maximum score for female was 14 while male was 15. Even though male and female tend to have different mean score but Mann Whitney U test in Table 3 and Table 4 show that there are no significant mean ranks of male (448.11) and female (42.61) on green practise knowledge, $U = 624.5, p = .364$.

| Gender | n  | Mean Score | Standard Deviation | Minimum Score | Maximum Score |
|--------|----|------------|--------------------|---------------|---------------|
| Male   | 22 | 11.13      | 2.21               | 6             | 15            |
| Female | 65 | 11.06      | 1.45               | 8             | 14            |

Table 3. Ranks

| Gender | N  | Mean Rank | Sum of Ranks |
|--------|----|-----------|--------------|
| Score  |    |           |              |
| Male   | 22 | 48.11     | 11058.50     |
| Female | 65 | 42.61     | 2769.50      |
| Total  | 87 |           |              |

Table 4. Test Statistics

| Score | Mann-Whitney U | Wilcoxon W | Z     | Asymp. Sig. (2-tailed) |
|-------|----------------|------------|-------|------------------------|
|       | 624.500        | 2769.500   | -.907 | .364                   |

a. Grouping Variable: Gender
Table 5 shows the score of green practise knowledge among the students with different ages. Findings determine that students with < 25 year (M=12.31; SD =1.49) tend to have highest mean score than others age students. Kruskal Wallis Test in Table 6 and Table 7 show that there are a significant mean ranks of among the students with different ages on green practise knowledge, \( \chi^2 = 8.909, p = .031 \). The mean rank in descending order are less than 25 year (61.69) > 31-35year (46.54) > 26-30 (40.53) > more than 36 year (36.41) in green practise knowledge.

| Age       | n  | Mean Score | Standard Deviation | Minimum Score | Maximum Score |
|-----------|----|------------|--------------------|---------------|---------------|
| < 25 year | 13 | 12.31      | 1.49               | 10            | 15            |
| 26 – 30 year | 51 | 10.84      | 1.52               | 6             | 14            |
| 31 – 35 year | 12 | 11.25      | 1.48               | 9             | 14            |
| > 36 year | 11 | 10.45      | 2.07               | 7             | 13            |

Table 6. Ranks

| Age       | N  | Mean Rank |
|-----------|----|-----------|
| Score     |    |           |
| < 25 years| 13 | 61.69     |
| 26-30 years| 51 | 40.53     |
| 31-35 years | 12 | 46.54     |
| > 36 years | 11 | 36.41     |
| Total     | 87 |           |

Table 7. Test Statistics\(^{a,b}\)

| Score   |     |    |
|---------|-----|----|
| Chi-Square | 8.909 |
| df     | 3   |    |
| Asymp. Sig. | .031 |

a. Kruskal Wallis Test  
b. Grouping Variable: Age

Table 8 shows the score of green practise knowledge among the students from different background of study. Findings determine that others course students (M=11.50; SD=1.77) tend to have highest mean score compare to others. Kruskal Wallis Test in Table 9 and Table 10 show that there are no significant mean ranks of among the students from different background of study on green practise knowledge, \( \chi^2 = 7.985, p = .092 \). The mean rank in descending order are others course (50.46) > civil engineering (50.17) > electric & electronic engineering (36.17) > commerce (35.35) > mechanical engineering (33.78) in green practise knowledge.
### Table 8. Students’ Green Practise Knowledge Score among Students from different Background of Study

| Background of Study | n  | Mean Score | Standard Deviation | Minimum Score | Maximum Score |
|---------------------|----|------------|--------------------|---------------|---------------|
| Commerce            | 10 | 10.50      | 1.72               | 8             | 13            |
| Mechanical          | 9  | 10.11      | 2.37               | 6             | 13            |
| Electric & Electronic | 18 | 10.72      | 0.96               | 9             | 13            |
| Civil               | 12 | 11.41      | 1.08               | 9             | 13            |
| Others              | 38 | 11.50      | 1.77               | 7             | 15            |

### Table 9. Ranks

| Background of Study | N  | Mean Rank |
|---------------------|----|-----------|
| Score               |    |           |
| Commerce            | 10 | 35.35     |
| Mechanical          | 9  | 33.78     |
| Electric & Electronic | 18 | 36.17     |
| Civil               | 12 | 50.17     |
| Others              | 38 | 50.46     |
| Total               | 87 |           |

### Table 10. Test Statistics\(^{ab}\)

| Score       |    |           |
|-------------|----|-----------|
| Chi-Square  | 7.985 |           |
| df          | 4   |           |
| Asymp. Sig. | .092 |           |

\(^{a}\) Kruskal Wallis Test

\(^{b}\) Grouping Variable: Background of Study

Table 11 shows the score of green practise knowledge between full time and part time students. Findings determine that full time students (M=11.12; SD=1.73) tend to have higher mean score than part time students (M=11.02, SD=1.61). However, minimum score for full time was 6 while part time was 7 and the maximum score for full time was 15 while part time was 14. Even though full time and part time tend to have different mean score but Mann Whitney U test in Table 12 and Table 13 show that there are no significant mean ranks of full time (45.06) and part time (43.05) on green practise knowledge, \(U = 899.5, p = .704\).

### Table 11. Green Practise Knowledge Score between Full Time and Part Time students.

| Mode of Study | n  | Mean Score | Standard Deviation | Minimum Score | Maximum Score |
|---------------|----|------------|--------------------|---------------|---------------|
| Full time     | 41 | 11.12      | 1.73               | 6             | 15            |
| Part time     | 46 | 11.02      | 1.61               | 7             | 14            |
Table 12. Ranks

| Mode of Study | N   | Mean Rank | Sum of Ranks |
|---------------|-----|-----------|--------------|
| Score         | 41  | 45.06     | 1847.50      |
| Part time     | 46  | 43.05     | 1980.50      |
| Total         | 87  |           |              |

Table 13. Test Statistics

| Score                    |       |
|--------------------------|-------|
| Mann-Whitney U           | 899.500 |
| Wilcoxon W               | 1980.500 |
| Z                        | -.380  |
| Asymp. Sig. (2-tailed)   | .704   |

a. Grouping Variable: Mode of Study

5. Conclusion
The knowledge on green practice among the students is at medium level. This condition needs to be improved because some of them are in-service teacher whereas some of them are the future teacher. They must aware that they are one of the individuals responsible for disseminating knowledge about of green practice to future generations in order to achieve the aims of sustainability development. Comparison of the green practice knowledge level from the aspect of gender, age, courses and mode of study showed that only students with different ages tend to have significant difference. The senior students need more exhortations and remind on green practise. Efforts to raise awareness about the importance of green practices in everyday life is utmost urgent. Additionally, future work on 5Rs (Reuse, Reduce, Reuse, Recycle, Repair and Recover) practising among the students is under investigation. As a citizen in the earth, they must remember their responsible with their waste throughout the 5Rs practising.

6. References
[1] Wan Omar, W. M. R. (2009). Minda: Ancaman Serius Pemanasan Global. Harian Metro. Retrieved from http://www.met.gov.my/pdf/news/article/HMetro6_26May2009.pdf
[2] Sulaiman, K. Dan Junus, L. (2005). Fenomena Ekuinoks dan Cuaca Panas. Utusan online. Retrieved from http://utusan.com.my/utusan/info.asp?y=2005&dt=0226&pub=utusan_malaysia&sec=rencana&pg=re_05.htm&arc=hive&arc=hive
[3] Muhd Hussin, S. H. (2007). Penilaian Prestasi Alam Sekitar: Dalam Aspek Kesedaran Alam Sekitar dan 3R Di Kalangan Pelajar Universiti Malaysia Sabah. Universiti Malaysia Sabah: Tesis Sarjana Muda.
[4] KeTTHA (2011) National Green Technology Policy Main Areas. Retrieved from http://www.kettha.gov.my/portal/index.php?r=kandungan/index&menu1_id=3&menu2_id=75&menu3_id=95#.Wgphw1uCzIU
[5] KeTTHA (2011) National Green Technology Policy Pillars. Retrieved from http://www.kettha.gov.my/portal/index.php?r=kandungan/index&menu1_id=3&menu2_id=75&menu3_id=93#.Wgpyl1uCzIU
Acknowledgments
The publication of this work was supported by the PPG grant (No. Vot: V012) awarded by Ministry of Education Malaysia (MOE) and the Office for Research, Innovation, Commercialization and Consultancy Management (ORICC) of Universiti Tun Hussein Onn Malaysia. The authors would also like to thank to those who graciously gave their time to participate in this study.